



Scanning -- Shortwave -- Satellites -- Ham Radio -- Computers

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Monitoring Times

Welcome to the
Italian radio relay service



MT Reviews:

- Radio Shack PRO-95
- Wavecom W40PC

AR8600 Mark II

Competitors Could Not Surpass the AR8600

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It's no wonder that many professionals, including government, newsrooms, laboratories, military users and more rely upon AOR, the **Authority On Radio™**.

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- 12 VDC operation
- BNC antenna connection

*Cellular blocked. Unblocked version available to authorized users, documentation required. Specifications subject to change without notice or obligation.

Finally, it's here!

The new WiNRADiO G303i receiver is shipping.

The exciting WiNRADiO G303i Software-Defined Shortwave Receiver is now available.

Why is it *Software-Defined*? Because the entire last intermediate frequency stage and all-mode demodulator are implemented entirely in signal-processing software running on a personal computer. This brings about significant advantages: performance, flexibility, configurability, reliability and convenience. There is also reduced risk of obsolescence, as new demodulators for new types of modulation are as easy to add as inserting a CD ROM into a PC drive.

The receiver comes on a PCI card and installs in minutes. Just plug the card in, connect its output to your PC sound card, install the supplied software, and let the world's most innovative shortwave receiver surprise you with its performance and amazing new features.

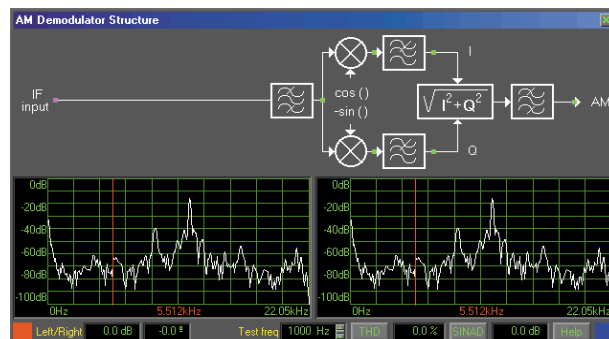


In addition to the flexible and friendly user interface with numerous functions and facilities not normally available on a conventional receiver, the WiNRADiO G303i Software-Defined Shortwave Receiver excels particularly with the ability of its demodulators: While the Standard Demodulator provides the performance of a highly respectable shortwave receiver, including synchronous AM demodulation and a real-time spectrum scope, the optional Professional Demodulator offers even more: continuous selectivity setting (in 1 Hz increments), interactive block diagrams with additional real-time audio spectrum scopes, built-in performance test facilities, user adjustable filters, and many other features. Additional demodulator types are planned as further options, including a DRM (digital radio) demodulator.

Just when you thought that there is nothing in shortwave that can surprise you anymore, here comes the new WiNRADiO G303i. It **will** impress you. We guarantee it.



The G303i control panel includes many exciting features such as numerous tuning and scanning options, spectrum scope and others. (Professional Demodulator shown.)



The Professional Demodulator contains an interactive block diagram for each modulation mode, two real-time spectrum displays and test facilities. A great tool to get familiar with *software radio* concepts.

Specifications

- Frequency range: 9 kHz to 30 MHz • Tuning resolution: 1Hz
- Modes: AM, AMN, AMS, LSB, USB, ISB*, DSB*, CW, FM3, FM6, FMN
- Antenna: 50ohm (SMA) • Dynamic range: 95dB • IP3: +8dBm

*Professional Demodulator Option only

System Requirements

- IBM PC compatible (CPU 500MHz or higher, PCI slot)
- Sound Blaster 16 (or compatible sound card)
- Windows 98/ME/NT/2000/XP

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Monitoring Times

Vol. 22, No. 1

January 2003



Lead Story

Welcome to Nexus-IRRS

By Bob Zanotti

In 1988 a new shortwave radio station took to the airwaves in Europe after being conceived a mere 6 months before. Its two adventurous founders set out to create something quite different from traditional Cold War broadcasting. Alfredo Cotroneo was the front man for the Italian Radio Relay Service, but few folks knew that his partner was Bob Zanotti of Swiss Radio International. This is the first time the full story has been told. Part 1 gets us on the air; Part 2 will tell about keeping an independent shortwave station going – an entirely different matter!

On the cover: On the roof overlooking the Po River Valley while performing antenna repairs. Inset: Alfredo Cotroneo at the gate to “the IRRS farm.”

International Broadcasting in Times of Crisis 14

By Sarkis Garjarian

Why does shortwave broadcasting become so important in times of international crisis or even in a local conflict? Why do people in the affected area tune in to shortwave stations, and which stations do they listen to?

We also explore how the broadcasters view their own role in reporting: What is their motivation? Why place their correspondents in potentially dangerous environment? These are interesting – and timely – questions to ask as the world’s “hot spots” seem to increase at same time as many broadcasters are abandoning shortwave.

How to Find Cool Utility Frequencies 16

By Jim Elvidge

The newcomer to utility listening – monitoring the shortwave radio communications of military, government, business and other entities – may very quickly become discouraged. These communications are not on any schedule, are usually not confined to a single frequency, and signals may or may not be consistently audible at your station.

So how do you get past the static and start hearing traffic? One way is to look at where the most activity has occurred. The author has done this, graphing the frequencies reported over many months of *Utility World* loggings

Monitoring Times Guide to APCO P-25 Systems 18

By Dan Veeneman

Part 2 in *MT*’s state-by-state directory of digital systems – those which can potentially be monitored using scanners with digital cards – concludes Florida listings and takes us through Michigan systems.

Buildings at the IRRS farm





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Reviews:

The **Radio Shack PRO-95** is a newer version of the PRO-93 and has a number of features to recommend it to anyone needing a trunk-following scanner, including excellent audio, short squelch tail, and moderate price (p.80). For the die-hard utility listener, especially one who is interested in digital communications, nearly all equipment gets pricey. An excellent value, however, is the “low” end of Wavecom’s decoder boards, the **Wavecom W40PC** (see p.84).

“Everything old is new again,” says John Catalano, who was curious to find technology fads like solar power, LCDs, and membrane keyboards reappearing in new and creative gadgets from **Cyberguys** (p.82). Speaking of gad-gets, our *Easy Access* column has been renamed to *The Gadget Guy*, and this month Jock Elliott introduces readers to his favorite gadget – **Plantronics’ CT10 Cordless Headset Phone**.

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New Technologies Undergo Labor Pains

Editor's Note: In an interesting contrast, W5YI covers two new technologies still in their infancy. One of them took on a life of its own without FCC guidance; the other (HDTV) looks like it will have to be legislated into life. Wi-Fi is a model of the way FCC Chairman Powell would like to see future spectrum use evolve (see "Closing Comments").

Wireless Networking

Like a cordless phone, wireless broadband computer networking allows you to use your laptop PC anywhere in your home – or even at public places – to access the internet without wires or cables. The technology is called wireless fidelity ... “Wi-Fi” for short.

A recent report from Juniper Research said, “It is the simplicity of WLAN (wireless local access network) that makes the technology so attractive, with no licenses to win (or pay for), no nationwide infrastructure to build (or pay for), and no significant technology risks to gamble. The equipment is standards-based, relatively low cost and simple to deploy....”

WLAN technology takes a high speed Internet connection that comes into your home or business over a phone wire or cable modem and changes it to a microwave (2.4 GHz) radio signal. 802.11 refers to a family of specifications developed by the IEEE in 1997 for wireless LAN technology. It specifies an over-the-air interface between a wireless client and a base station or between two wireless clients.

There are several specifications in the 802.11 family. Wi-Fi is also another name for IEEE “802.11b” ... a wireless transmission standard overseen by the Wireless Ethernet Compatibility Alliance (WECA). Products certified WECA are interoperable with each other even if from different manufacturers.

802.11b is an extension of wired Ethernet, bringing the same principles to wireless communication. The IEEE 802.11b standard allows for the wireless transmission of approximately 11 Mbps of raw data at indoor distances from several dozen to several hundred feet and outdoor distances of several to tens of miles as an unlicensed use of the 2.4 GHz band. The distance depends on impediments, materials, and line of sight.

The standard calls for 14 channels, which are staggered at a few megahertz intervals, from 2400 MHz to 2483.5 MHz. Different channels are legal in different countries, and only chan-

nels 1, 6, and 11 have no overlap among them.

Wi-Fi operates through a “gateway” ... a base station that transmits the Internet to any Wi-Fi-enabled PC or PDA (personal digital assistant.) A basic wireless network requires two devices, a base “gateway” station (also referred to as an “access point”) and a wireless card for a laptop, PC or PDA. You simply plug the gateway (about \$200) into your cable modem or DSL. A Wi-Fi card (about \$60) with a protruding antenna goes into your laptop, PC or PDA. A user with a Wi-Fi product can use any brand of base station with any other brand of client hardware that is built to the Wi-Fi standard.

That’s all there is to it. The range indoors is predictably around 100 feet depending on building construction and layout. There is a potential for interference with other home gadgets like microwave ovens and newer cordless phones, which operate in the same 13-cm radio band.

Aside from buying a base station and wireless card, in most cases the only additional expense is the monthly Internet connection, typically \$40 to \$50 for broadband access.

The wireless Internet is not confined to homes and small businesses. Companies such as restaurants, airports and hotels are making a push to set up local Wi-Fi “hot-spots” – PWLANs (public wireless local area networks) for which they charge users a fee to get online. The costs of starting up a “hotspot” is low and existing wired phone carriers and ISPs are getting into the business.

Technology enthusiasts across the country are also setting up competing, free community networks by sharing their home Internet connections with the neighborhood. Some users are splitting the cost of their high speed connection with neighbors. Internet Service Providers have no problem with users sharing Web connections within their own home, but consider offering service to friends to be a form of theft of service.

Congress Attempts to “Jumpstart” DTV Conversion

TV stations are facing the unsettling prospect of turning off their analog signals in a little over four years. House Energy and Commerce Committee chairman Billy Tauzin (R-La.) has suggested draft legislation that could force TV stations to return their analog TV channel spec-

trum to the government at the end of 2006, regardless of how much of the public have the capacity to receive DTV (digital television) transmissions.

In late September, Tauzin introduced an omnibus, bipartisan digital television bill that addresses a menu of still unresolved issues concerning the transition to digital television. The legislation focuses on the obstacles that have been identified as impediments to the transition and suggests solutions.

As the law stands now, a TV station’s analog spectrum is to be returned by the end of 2006 providing 85 percent of any station’s market is digital-TV-capable. This precondition is causing many TV stations to drag their feet on converting to digital transmission. It is now becoming increasingly clear that the transition to DTV will not occur in 2006 given its present pace.

Among the suggestions in the draft Omnibus Digital Television (DTV) bill is a provision permitting the government to seize frequencies used for traditional analog signals. The bill simply legislates analog televisions out of existence by requiring broadcasters to transmit digital signals by the beginning of 2006, and requires them to cease standard, analog broadcasts by the end of that year. That means that standard televisions and VCRs would be obsolete.

Congress has an ulterior motive for getting the DTV logjam moving. They want to be able to sell the airwaves currently used by analog TV transmissions to the telecommunications industry for new wireless bells-and-whistles (see *Closing Comments*.) Without the spectrum being made available, the U.S. faces a potential budget-busting loss of \$18 billion. That’s the amount the government anticipated from the sale of analog TV spectrum when it passed the balanced budget amendment five years ago.

Regardless of the scope of the bill, however, no legislation is expected to pass until well into 2003. The obsolescence of nearly 300 million sets and other appliances, the cost of new digital equipment, and diminished rights for home recording are the core conflicts likely to keep broad DTV legislation jammed up in the Energy and Commerce Committee for much of next year. A new session of Congress begins in January, and with it, a new start on DTV legislation.

The Future and the Past come together on your computer!

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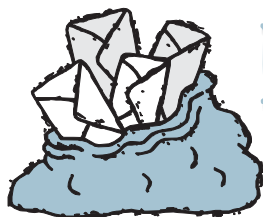
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LETTERS

TO THE EDITOR

Monitoring the Military

Increased security following September 11, 2001, and the potential for military conflict with Iraq has had the effect of creating much more activity and interest in military communications, while federal signals have largely gone quiet due to the wider use of digital radios. Assistant Editor Larry Van Horn has therefore decided to reverse the columns he authors so that *Milcom* is published monthly, and *Fed Files* will appear bi-monthly. Reader contributions to both columns are, as always, warmly appreciated.

Speaking of military action and global hot spots, I want to apologize to author John Locker for a really strange typo that was not of his doing. His November cover story, *Surveillance in the Clear*, mentioned his concern that sensitive information was being broadcast by satellite from the "target areas, Kazoo and Macedonia." My atlas says there's no such entity as "Kazoo," anywhere; I'm really surprised I didn't get letters! It was, of course, supposed to read "Kosovo."

Beginner's Corner Feedback

Ken Reitz shares this letter from Steve Cherry regarding the August and September *Beginners Corner* articles.

"First, thanks for the great suggestion about using electric fence wire from The Tractor Supply Store for antennas. I was all set to invest about 20 bucks for 200 feet of antenna wire from an electronics supply house. Well, for \$11.12 I purchased 1/4 mile of 17 gauge aluminum electric fence wire and put up a 255 foot long antenna about 50 feet up between a couple of trees in an open field. It works great! It is out-performing both of my other antennas (a dipole and a sloper). In choosing between 10 cents a foot or less than 1 cent a foot, it was no contest!

"Secondly, I am a SWL and a beginner in the field of electricity and electronics. Therefore I found your August 2003 article on suggestions for a basic toolbox very helpful. I have begun to read some 'basic' books and have started building my toolbox. I purchased the analog multimeter from Radio Shack, but discovered that the book *Using Your Meter* has been discontinued. An e-mail from Radio Shack customer service stated that there are no copies in Radio Shack's inventory. The only remaining copies are those that might still be in individual stores.

I found another book in the same price range at Barnes & Noble (\$6.95 and 102 pages). It is *Getting the Most From Your Multimeter* by R.A. Penfold... The description of the book states: 'This guide to multimeters is aimed at beginners and those with limited experience of electronics. Chapter 1 covers the basic of analog and digital multimeters; chapter 2 describes methods of component checking; and chapter 3 looks at circuit testing.' I have ordered a copy but have not received it yet...you might want to share it with other readers who might not be able to find the

Radio Shack book.

"Thanks again for your very helpful articles in a great magazine."

— Steve Cherry, Warrenton, VA

The Little Red Box

by Bob Grove W8JHD

Forrest Haynes, K4YPO, always had a twinkle in his eye and an inexhaustible sense of humor; like me, he was a hamfest addict. We first met decades ago in West Palm Beach where we attended the annual amateur radio conclaves around the state. I loved to swap stuff and so did he.

Of particular note, however, was one horse trade that took on an identity of its own, for the armful of goodies he got from me included a little red box which contained — of all things — a "gas saver" device. It was a small cylinder that plugged into the car's distributor and promised increased fuel economy. For some reason, the bogus box tickled Forrest, and at the end of the hamfest, I discovered that he had secretly put it back in my load of goodies.

The challenge was set: At every hamfest from then on, unseen, one of us would stealthily slip the little red box into the other's belongings where it would be discovered while unpacking back home.

But over the years, time took its toll. Forrest suffered a variety of age-related illnesses which prevented his attending hamfests, and I moved to North Carolina, making our chance meetings at hamfests a rarity.

About a month ago I called Forrest just to chat about old times; his first question, of course, was "How's the little red box?" I reassured him that it was just fine.

On October 22, 2002, Forrest died at the age of 83. It's funny how that little red box now means so much to me. Goodbye, old friend.

Old-Time Hucksters

Since we're already off the radio topic, here's another story about gas mileage!

"I am 84 years old. When I read Bob's *Closing Comments* on con games (April 2002), I was reminded of an experience in 1930 when I was thirteen.

"I read an ad in a 'western' magazine about a great device that would provide a significant improvement in gas mileage. It cost \$2, which was a lot for a 13-year-old during the depression, but I thought the device would improve the mileage of my father's car. So I scraped up the money from helping a neighbor lady clean up her garden at thirty cents an hour and ordered the device.

"It was a little die-cast T-shaped thing with

a 1/8 male pipe thread on the foot of the T, for threading into the intake manifold. In those days there was a vacuum device to pull gas from the tank to the carburetor, and the windshield wiper was operated from vacuum, both of which were connected to the intake manifold. The so-called mileage improver was supposed to be screwed into the intake manifold.

"At the two ends of the top of the T were screw-on caps. When I unscrewed those caps I found there was a blind recess with a ball bearing in each. The device was a fraud. There was a hole where the device was screwed into the manifold, but it went nowhere.

"I was too embarrassed to tell my dad of the magic device I had obtained that was going to improve his gas mileage by 20%! ... The old games are still being played on the unsuspecting!"

— H. Benner Hoepfer, Wauwatosa, WI

More Opinions on MARS

"In my opinion, the DAIG (Dept of the Army Inspector General) Report was probably right on target. I have been a member of both USAF MARS (many years ago) and Navy MARS (recently). The MARS (Military Affiliate Radio System) programs have failed to develop a clientele for whatever services they can provide. The phone patch traffic that made MARS famous has all but dried up. A large percentage of deployed military personnel have access to email and satellite telephone service. MARSGRAMs often move so slowly that mail is quicker. In fact, they are often mailed instead of being delivered by telephone.

"The current emphasis on emergency communications support is pointless unless the various MARS programs can identify their customers. Show up at a disaster scene and tell the on scene commander that you're from MARS and you're there to help and you may be told to sit tight until the boss — he's from Pluto, by the way — gets there to talk to you.

"Another problem is a lack of deployable assets. How many MARS members are willing to move their stations to the scene of whatever situation they are asked to support? How many have phone patches that they can use to put emergency management personnel in voice contact with the people they need to talk to? The list goes on and on."

— Don Osterhaus K0TUY, Council Bluffs, IA

"Thank you for the informational copy, and again for an excellent effort in publicizing the thrust of the DAIG investigational report. This response confirms what has been alleged about the programs, and what has been revealed in the DAIG report regarding Army MARS.

"I suspect that many MARS members privately agree with the lack of program substance, particularly as it relates to the core mission. Many are loathe to admit, or discuss the issue

openly. With a little coaxing, a sufficient cross section of MARS members may begin to challenge the characterization of sufficiency championed by program leaders. Perhaps this, along with internal pressures generated by the DAIG report findings, may result in needed reforms."

— Al Uvietta, kc5s@arrl.net



The above pictures are of a memorial to Marconi. It is located at the intersection of Atwood Ave and Plainfield St. in Johnston, Rhode Island. The intersection is now called Marconi Square. It was dedicated April 2002. The Memorial consists of a radio tower with a red beacon light on top.

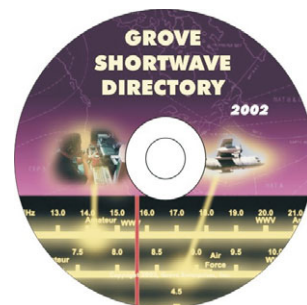
— Don D



We welcome your ideas, opinions, corrections, and additions in this column. Please mail to **Letters to the Editor**, 7540 Highway 64 West, Brasstown, NC 28902, or email editor@monitoringtimes.com. Letters may be edited for length and clarity. Happy monitoring!

—Rachel Baughn, KE4OPD, editor

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Scanners and Homeland Security

There was much ado on the internet when the House passed the Homeland Security package with the Cyber Security Enhancement Act (CSEA) attached at the last minute. However, much of the hobbyist concern is misplaced.

While the changes CSEA makes to the Electronic Communications Privacy Act (ECPA) now in force greatly increase penalties to illegal monitoring, it does not alter what is considered to be illegal. Part of the intent in raising penalties from 6 months to 5 years (per an exchange with the Dept of Justice during a Congressional hearing) seems to be to encourage the Justice Department to follow through in enforcement. (See *Monitoring Times*, September 2002, pp.4-5, for more.)

So, unless you are engaged in listening to communications which are already illegal according to the ECPA, you can continue to scan VHF/UHF frequencies, listen to HF utilities, and report your loggings to *MT* or your favorite newsgroup without fearing unexpected consequences.

Killer Technology?

Ultra-wideband wireless is one of the new "killer" technologies that has a lot of folks in the industry excited and hoping for roll-out in a number of products in late 2003. But recent NASA tests disputed the Federal Communications Commission's contention that the low-powered signals would not pose a risk to protected bands. UWB can spread a low-powered signal all across the spectrum, including the aeronautical band.

In NASA tests in a (fortunately) grounded aircraft, sending UWB signals from any passenger seat seriously disrupted safety systems such as the Traffic and Collision Avoidance System (TCAS) and the instrument landing system. One developer claimed the powers being used were entirely too high for a realistic test, and even NASA admits the early results are preliminary and inconclusive.

James Miller, a technology expert for United Airlines, as quoted in *Popular Mechanics*, said "the FCC has shifted the burden to us: We have to police UWB use, or prove that UWB is unsafe, rather than making manufacturers prove that it is safe." (See *Closing Comments* for more on this trend in FCC regulations.)

Cellphone After-life

Cellular phones have the potential to damage public health in more ways than their disputed potential for causing traffic accidents, brain tumors, and creating a public nuisance. Discarded phones, batteries and chargers may soon add up to 65,000 tons of waste, which adds to the chemicals moving up the environmental chain into humans. It's an even bigger problem in Europe and Japan where users are pressuring manufacturers to eliminate the toxic chemicals.

One suggestion to eliminate waste is to require companies to initiate take-back programs, and some companies, such as Verizon and Sprint,

already do. Some states have also initiated recycling programs, and so have many civic groups. For example, the California Federation of Women's clubs collects dead cell phones and batteries which are sent to the Wireless Foundation sponsored by Motorola; there they are reprogrammed and distributed to people in emergency or life-threatening conditions.

Doug Robertson of Oxnard, Calif., wrote *MT* to remind readers that "the FCC requires any cell phone, whether it is covered by an active service plan or not, be capable of calling on the universal 911 emergency number for free.

"So, keep an old cell phone in your car just for emergency use, or consider passing it along to a deserving person as a safety device. Just be sure the battery is fully charged. This could be an alternative to sending a non-biodegradable electronic device to a landfill or local dump site, and may even save someone's life."

Navy Sonar Temporary Halt

Last spring the Navy admitted their experiments with active sonar bursts was linked to death and injuries of marine mammals. In July the National Marine Fisheries Service decided that sonar would have "negligible impact" on marine species as long as it operated 12 miles from shore and was immediately shut down if whales were spotted. It also permitted the Navy to "harass or injure" up to 12 percent of any species of whales, dolphins, or other marine mammals.

Environmentalists sued on the basis that the federal government was violating its own federal laws designed to protect these species. An attorney with the Natural Resources Defense Council said, "There was no justification for giving the Navy a blank check to operate this sonar in 75 percent of the world's oceans." Federal judge Elizabeth D. LaPorte imposed a worldwide ban until Navy and environmentalists could agree on a list of spots where sailors can deploy the sonar without injuring marine life.

A tentative agreement was reached on November 15 to allow the Navy test the sonar for seven months in one million square miles in a northwestern section of the Pacific. The remote testing area is not likely to have a high presence of marine mammals and is away from feeding and breeding areas and whale migration routes.

Low frequency active sonar has also been under test by NATO and the British navy.

A separate lawsuit was won in October by the Center for Biological Diversity to stop the National Science Foundation's seismic research in Baja California. In this research, powerful air-guns fire sonic blasts into the seabed to map the earth's crust. Environmentalists believe it may be linked to the deaths of at least two whales.

Seismic testing used for oil and gas exploration uses a similar technique to map the ocean floor. One researcher said hundreds of ships are probably using the same type of gun, which have been in common use since the late 1960s.

EchoStar Merger Nixed

EchoStar's plan to acquire the nation's larg-

est satellite-TV company, Hughes Corp.'s DirecTV, would have created a company with 18 million customers. The company promised it could finally deliver local TV channels to 200 markets and affordable high-speed Internet access.

However, in its first rejection of a merger since 1967, the Federal Communications Commission said no to the proposed merger, saying it would have created the nation's largest pay-TV service. Neither DirecTV nor EchoStar want to give up on the merger until Jan. 25, when the contract expires, in order to avoid paying a substantial breakup fee. EchoStar had until late November to file an



Jan 4: Huntington Beach, CA

The American SWL Club-ASWL meets 12 noon to 4pm PST at 16182 Ballard Lane. These monthly meetings are open to all worldband shortwave radio listeners. Contact Stewart MacKenzie-WDX6AA at wdx6aa@earthlink.net or phone: 714-846-1685. <http://communitylink.ocnow.com/groups/aswl>.

January 11: Greenwood, SC

Greenwood ARS Hamfest at Greenwood Civic Center. Contact W4JAK Pres. GARS, 106 Dorchesters Dr, Greenwood, SC 29646.

January 18: St Joseph, MO

Missouri Valley & Ray-Clay ARC 13th Winter Hamfest at the Ramada Inn (I-29 and Frederick Ave, Exit 47 on I-29); talk-in 146.85, 444.925; 8a.m.-2p.m., \$3 adm. FCC exams, exhibitors, flea market all indoors. Northwest Missouri Winter Hamfest, c/o Neal or Carlene Makawaski, WBOHNO/KAOIKS, 3704 Meadowoak Lane, St Joseph, MO 64503, 816-279-3406; nem3238@ccp.com

January 19: Oyster Bay, NY

4th annual Ham Radio University 2003 - a day of education about Amateur Radio, East Woods School (31 Yellow Cote Road, Oyster Bay, Long Island); 8a.m. Talk-in on W2VL 146.850 -600 136.5 PL, 147.210 +600

Forums geared to the non-ham as well as the experienced ham radio operator. The focus will be "hands on" with many demonstrations of everything from satellite communications, low power operating using radios as small as a tuna tin, and the latest in emergency communications. VE session for FCC exams and Special Event Station on HF.

HRU 2003 is sponsored by the Long Island Mobile ARC and is a cooperative effort between over twenty clubs and organizations in the NYC-LI area. It is also an ARRL Section Convention. Information will be available about the different groups, ham radio classes, exam session schedules, public service and other activities.

Admission is open to all - donation is \$2 per person. For more information contact: George Tranos N2GA, ARRL NJ Section Manager, 631-286-7562 N2GA@arrrl.org

Feb 1: Negaunee, MI

Hiawatha Amateur Radio Association 24th annual Swap and Shop 10 am to 3 pm at the Negaunee Township Hall (43, M-35, Negaunee). There will be door prizes, food and a raffle. Talk-in is on 147.27. Contact Bob Serfas, N8PKN, at 906-226-9782 or e-mail at: n8pkn@aol.com

amended proposal, and a final answer is expected from the FCC on January 21st.

The Justice Department and 23 states went to court in November to further block the deal, claiming the merger would lead to higher consumer prices and less service than is now the case with the "vigorous competition" between Hughes and EchoStar. On the other hand, EchoStar told investors that if the deal doesn't go through with DirecTV, the company will likely be forced to increase prices.

Military Relies on Commercial Satellites

If you found John Locker's account of finding military surveillance pictures on his satellite receiver to be disturbing (Nov. 2002 cover story), just wait until you hear this. The Department of Defense currently relies on commercial satellites for 50 percent of their satellite needs – and that's in peacetime. A report from the General Accounting Office (GAO) expressed concern about the security of this data. Federal agencies may encrypt the data uploading to the satellite, but lose control of the security once the data is in the hands of the commercial operator. Commercial satellites are also more likely to be vulnerable to hacking or jamming.

Planespotters Acquitted

As reported in the June 2002 *Communications* column, a group of British and Dutch plane spotters were arrested in Greece, held for five weeks, and then convicted on charges of espionage and aiding and abetting. The incident shocked hobbyists and diplomats alike. All were released and allowed to return home pending appeal.

Paul Coppin, 57, who organized the trip to Greece, wasn't expecting too much from the appeal, "After what happened last time, we don't really expect very much. I think a reduction of the sentence would probably be the best outcome."

In a pleasant surprise, on November 5th the appeals court of three judges overturned the convictions. "They did not believe they were doing anything wrong and we accepted their good faith," the head judge said, after more than an hour of deliberation.

Railspotters Encounter Suspicion

Thousands, perhaps millions, of people around the world love trains and spend much of their time observing and photographing railroad operations. In general, railroads have encouraged these "railfans" as long as they do not trespass or interfere with operations. Railroads even hold contests to use railfan photographs in calendars, and the Association of American Railroads has a Web site to encourage the hobby.

But after the FBI announced it had credible reports that al Qaeda might be targeting railroads, a growing minority of railfans have been questioned and sometimes searched. A handful have even been threatened with arrest.

Law enforcement officers and train crews have been told to be on the lookout for suspicious characters asking detailed questions about railroad operations, taking notes and taking pictures of trains. It appears the descriptions of "terrorist" and "railfan" are the same.

"We certainly aren't out to destroy an American tradition of watching trains, but we have to be careful," said John Bromley, head of public relations for Union Pacific. Normally, police who encounter railfans simply check identities and record names and other basic information. But a few encounters go beyond that.

Even as police and the railroads view railfans with suspicion, Federal Railroad Administrator Alan Rutter says the railfan network could be "a real value" in spotting truly suspicious activity. Rutter said the government is already taking advantage of the intelligence-gathering abilities of railfans, which is substantial.

Meanwhile, railfan chat sites have been filled with advice on what to do about the growing police attention. That advice includes a caution that the railroads also stress: Don't trespass on railroad property. The advice also includes ways to look unthreatening, by wearing a shirt with a locomotive on it, for instance, or carrying railfan magazines to show police officers who never heard of the hobby.

"As crazy as it sounds, you need to educate the cop about our strange hobby in under 60 seconds," wrote Todd Clark, the webmaster of Trainorders.com. That advice should ring familiar to a lot of scanner and utility radio hobbyists!

– source: The Washington Post

Internet Music Compromise Reached

Congress passed a bill Nov 15 intended to stave off the collapse of many fledgling Internet radio broadcasters. The legislation resolves a bitter battle over the royalties that Webcasters must pay music labels when they stream their songs over the Internet rather than broadcasting them through the traditional airwaves.

In October North Carolina Republican Senator Jesse Helms used a procedural move to block a nearly-successful bill that many small operators and public stations claimed would put them out of business. The move sent interested parties to the negotiating table as Congress convened for a post-election, lame-duck session. What emerged was a bill, co-authored by Sen. Patrick Leahy, that all sides said they could live with.

The bill is a boon for small operators because it will allow them to negotiate deals to pay fees based on a percentage of their revenue. Some of those operators otherwise would have been forced to pay rates based on how many songs they play – considerably more costly.

Another provision in the new bill postpones for six months all royalty payments from public broadcasters, including colleges and universities, to give them time to draw voluntary agreements with representatives of the music labels.

Steve Anderson Arrested By Feds

Steven Howard Anderson, a.k.a. Steve Anderson, formerly the operator of the KSMR, the longest running clandestine station in history with both a target area and a transmitter within the United States (in Pulaski County, Kentucky), was arrested November 22 in Cherokee County, North Carolina (just a few miles from *Monitoring Times* headquarters), by officers of the Federal Bureau of Alcohol, Tobacco, and Firearms and the North Carolina State Bureau of Investigation. According to the Louisville *Courier Journal*, Anderson was initially held in Buncombe County Jail in Asheville, North Carolina, pending a planned transfer to a Kentucky detention center on or about November 25, where he was scheduled to face various charges.

For more background on this story, refer to the feature article by Hans Johnson in the April 2002 *Monitoring Times*. Anderson has been at large since allegedly shooting at a Bell County sheriff's deputy on Oct. 14, 2001. A tip received by "America's Most Wanted" and forwarded to federal officials led to the arrest.

"Communications" is compiled from news items contributed by our readers to Rachel Baughn, KE4OPD, Editor. Thanks to this month's MT reporters: Anonymous, Albany, NY; Harry Baughn, Brasstown, NC; Doug Robertson, Oxnard, CA; Brian Rogers, Melvindale, MI. Via e-mail, Alan Henney, Jerry None, Russ Rothbard, Bill Siedsma, Larry Van Horn, Barry Williams, Robert Wyman, David Zantow and George Zeller

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Italian radio relay service

In the fall of 1988, a new shortwave radio station took to the airwaves of Europe. It started as a vision only six months before, and was operational in record time, thanks to the enthusiasm of its founders and a measure of good luck. This was a private station, with an independent, eclectic, experimental message – something distinctly different from the classic international broadcasters of the Cold War era. It's a story of broadcasting success against all odds, and how what started out as a gamble has made European broadcasting history. Bob Zanotti, formerly of Swiss Radio International, was a co-founder of the station, and has now decided to tell the story.

Welcome to Nexus – IRRS

By Bob Zanotti

Part 1: The Idea is Born

The poets say that spring is the time for renewal and rebirth, the time when everything begins to bud and flower – the time when ideas are born. It was April 1988. The daily routine in Bern was comfortable – too comfortable. “News, comment and current affairs” was the order of the day. We did it in our sleep. There was a need for a creative “diversion.” The idea presented itself: start up a shortwave radio station that offered an eclectic format with lots of room for experimentation, to offer the European Continent something new and refreshing. At that time, there was only one country in Europe where private shortwave could be done legally: Italy. And it was very close to home.

I don't believe in coincidences. One morning, a colleague told me about an idealistic gentleman from Milan, who had just dropped in at SRI to ask for transcription material for his English-language FM station in the northern Italian metropolis. It was called Globe Radio, one of the first private FM stations to go on the air there in the 1970s, after the Italian constitutional court decided that any Italian citizen had the right to operate a broadcasting facility. Globe Radio had been set up to provide a wide variety of rebroadcast programming for the large English-speaking community of greater Milan. The man's name was Alfredo Cotroneo. Then in his late 20s, Alfredo was a software engineer with a passion for the English Language...and broadcasting. A phone call, and we had an appointment set for a few days thereafter.

It was a beautiful, warm, sunny spring day in northern Italy. My wife was with me, and for us, it was like a mini-vacation. We loved Italy, and still do! From Chiasso on the Swiss border to Milan's ring road – the *Tangenziale* – was an easy 20 minutes. In *Milano centro*, the traffic was chaotic, and I thought to myself how lucky I was to have learned to drive in the New York area – I felt at home! We arrived at a classic Milanese apartment house on the fashionable East Side of the city. The large FM antenna array on the roof confirmed that we were at the right place.

Up the elevator to the top floor. At the door of his spacious apartment stood Alfredo, a warm smile on his face. We felt most welcome. After the traditional *aperitivo*, Alfredo listened attentively to my pitch. “Alfredo, listen around the shortwave bands, and what do you hear? Information and propaganda. There is little or no personality. What Europe needs is a shortwave radio station that isn't afraid to do something different. Something experimental and freely expressive. This can only be done in Italy. Are you interested?” He was.

At the end of the day, Alfredo and I had agreed to provide initial financing for the necessary transmission equipment out of our own pockets, and do the installation work ourselves to keep costs down. But how was the station to cover its operating costs and, hopefully, even generate a little extra “pocket money” for us?

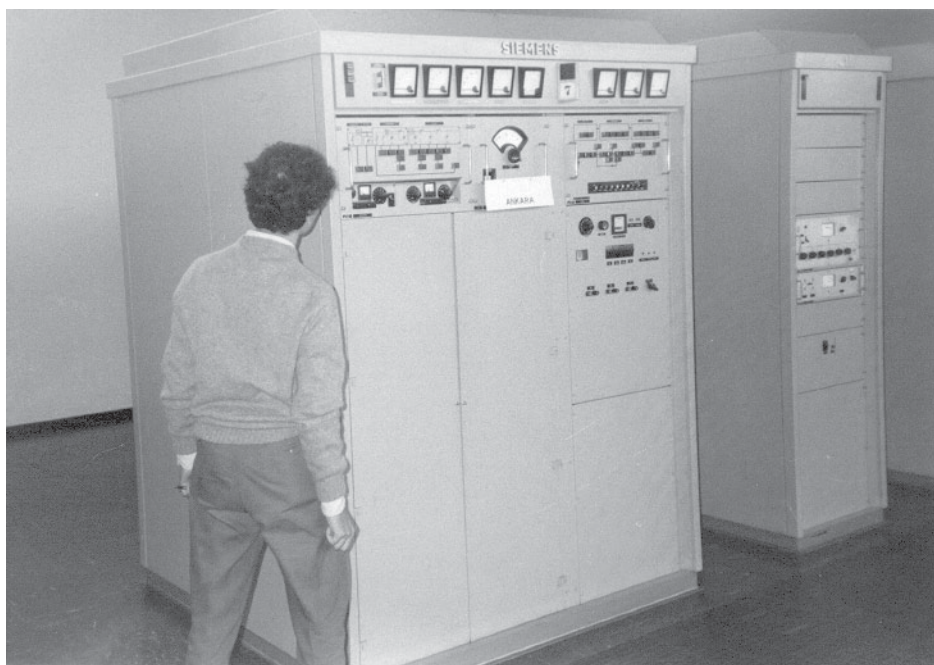
Although I personally hoped there would be a chance to produce our own programming

somewhere along the line, it was clear from a business point of view that the sale of broadcast time would be the most likely source of income for the station. So, we decided to go ahead with the concept of a time-selling relay station, while not excluding the possibility of other types of experimental programming. In reality, there would prove to be lots of room to “play” with the station.

“But by the way, Alfredo, what shall we call the station?” “How about IRRS – The Italian Radio Relay Service?”

Transmitters from Schwarzenburg

The next, rather sobering, issue facing us was where to find a transmitter. The prevailing idea was to use a good amateur transceiver to drive a commercial-quality linear amplifier. This approach would have provided us with a reli-



The one that got away: Alfredo looks at the massive 30 kW Siemens TX

able 1.5 kW AM signal. We knew it wasn't the "professional" solution we wanted, but it seemed the only realistic option. But one day, I heard that the Swiss telecom authority – the PTT – was selling a number of German-built Siemens 30 kW transmitters at the main SW plant at Schwarzenburg, outside Bern. These units had been used for SSB radiotelephone links to overseas, before satellites took over. Having been a regular visitor at Schwarzenburg over the years, I knew exactly the transmitters in question. It was worth looking into, so Alfredo and I decided to meet in Schwarzenburg.

The devil is in the details, as they say. And so it was with these transmitters. The specifications sounded great: 30 kW PEP in A3J, and 7.5 kW in A3 AM mode. But (and it was a very *big* "but"), they were enormous in size! Each transmitter was about six feet square. That was bad enough. But on top of it – or I should rather say *below it* – was a huge ventilation system of the same dimensions. This was definitely not what we were looking for.

Remember I said at the beginning that there are no coincidences, and that everything has a purpose? Enter my long-time friend and partner at the *Swiss Shortwave Merry-Go-Round*, Bob Thomann. After one of the MGR recording sessions, we went to a nearby café for a beer and a chat, as was our ritual. I told Bob about "the project." I also described the visit to Schwarzenburg, and the disappointment about the 30 kW transmitters. At this point, we have to recall that Bob Thomann was still working for the Swiss PTT, and that he was responsible for engineering at *Berna Radio*, Switzerland's HF aeronautical service, which provided worldwide ground-to-air communication, mainly between Swissair aircraft and their home base in Zurich.

After I finished telling the story about the disappointing 30 kW units, Bob looked at me and said: "There's something better around. Do you know those two 10 kW Siemens transmitters in the middle of the entrance hall at Schwarzenburg? Those are ours [Berna Radio's], and the PTT wants to sell them, because Berna is being moved to Prangins [near Geneva], and they already have new transmitters installed there."

The 10 kW transmitters Bob Thomann referred to had features that were way ahead of their time. They were self-contained, compact and powerful, the size of a large refrigerator, and used solid state technology, except for the driver and final. They were capable of seamless operation between 1.5 and 30 MHz in 100 Hz steps, with automatic frequency changes. In fact, they were capable of antenna tuning across the entire working range in less than eight seconds flat (in practice, in only three to four seconds). They were designed and built to work reliably in the most extreme operating environments. Heavy-duty commercial, military stuff. All transmission modes were possible, including standard AM (A3), SSB (A3J), and even reduced carrier SSB (A3A), which is what we wanted. A3A would give us the efficiency and punch of SSB, while being compatible with ordinary DSB AM receivers. As a further engineering bonus, they could be easily automated



Alfredo Cotroneo stands at the IRRS transmitter

and computer-controlled – something for the future.

Alfredo called his contact at the Swiss PTT. They were surprised to know that Alfredo "knew," but yes, the Siemens 10 kW's were for sale; they would even throw in a new final and a lot of spare parts for good measure. We had our transmitter!

Finding the Ideal Transmission Site

Any HF engineer or radio ham knows that power is not the main factor in producing a good SW signal. Far more important is the transmission location and antenna system. Milan is located in the Po Valley, which is an ideal location for shortwave. Outside the city are still many farms on large tracts of land. Ground conductivity is excellent, and the terrain is as flat as a pool table. Alfredo immediately placed ads in several regional newspapers, and we went into standby mode.

In the meantime, I contacted a dear and trusted friend, the late Al Schalk, who lived in the mountains of Italian-speaking Switzerland, right on the border with Italy. I let him in on the plan, and he enthusiastically started his own search for a possible transmitter site. Al called me one evening to say that he had heard of a couple of candidate locations. Alfredo and I both took a Friday off, and we met Al at his home in the tiny village of Indemini. We had a typical two-hour lunch on the Italian side, and then set off to look at possible sites. One location was a strong candidate, featuring an open plateau and a clear shot in all directions. On the down side, the soil was rocky – not ideal for HF; there was heavy snow in winter, making accessibility difficult; and there were frequent power failures in bad weather. The negatives at this mountain location were simply overwhelming.

Through Italian friends in Switzerland, I heard about a location just off the highway, north of Milan. At the same time, Alfredo faxed me that he had received replies to his newspaper

ads. So once again, we arranged a long weekend meeting to check them out. One location was good, but too close to an apartment complex. Italian households were not extensively cabled at that time, so we were concerned about the possibility of BCI and TVI – grounds for closure by the authorities. The risk was too great.

We then went down the list – including a convent (!), but discounted all of them, mainly on technical grounds. It was getting late and we were starting to get a little depressed. Alfredo then told me he had one last offer of a site. It was on the west side of Milan. It would take about an hour to get there, but it might be worth the trip. We agreed to give it a try.

We Reach the Promised Land

It was nearly dark when we arrived at what



Alfredo standing at the gate to the "IRRS"

would prove to be our final destination in the quest for a home for our transmitter. We were now in a village about 25 miles west of Milan. There was a river a few hundred feet away, and the terrain was flat in all directions – and wet. Perfect ground conductivity! The high, iron gate to a huge, classic Milanese farm was impressive – even somewhat ominous. Alfredo rang the bell, and a few moments later, Vincenzo, the owner, greeted us.

Past the gate, we found ourselves in a very large courtyard. Roman style, the entire area was secured by high walls. And in classic Milanese farm style, there were high brick buildings all joined together. Several had been used as apartments for farmhands and extended family members. The now-empty, non-conductive buildings were high enough to give us the 1/4 wavelength we needed above ground. This meant they could serve as antenna mounts, thus eliminating the need for free-standing towers – a big money-saver. In short, it was a perfect location. I remember turning to Alfredo and saying: “Alfredo, this is it. We’ve found it. We need look no further. This is where we will build our station!”

Getting the Transmitter to Italy

The purchase deal with the Swiss PTT was done, and Alfredo arranged to pick up the transmitter with a rented truck. He spent the night before with us in the Emmental, and we ate, drank, and celebrated the future of the project. We were in good spirits, literally as well as figuratively!

By the time Alfredo arrived in Schwarzenburg next morning, “TX 19” had been removed from its mountings and was ready to be loaded into the truck. Overseeing the operation was Paul Stettler. Paul was the “father” of the two Siemens 10 kW. He was the Schwarzenburg engineer who had been placed in charge of them since their installation in the 1970s, and knew them like his own children. “Number 19” was now on its way to another home, but its sister unit – “TX 20” – would remain in Schwarzenburg as a back-up for the



Paul Stettler loads transmitter onto truck at Schwarzenburg



The transmitter building at the farm (with antenna)

new Berna Radio transmitters at Prangins.

I had visited Paul Stettler in Schwarzenburg beforehand, to get acquainted with the transmitter. He taught me a lot, and as time would prove, his own involvement with “TX 19” would not end that day.

Alfredo did not have an easy time at the Italian border and wound up having to engage the services of a local export broker in Chiasso, even spending the night there. The next day, he got clearance to proceed and arrived at the farm that evening. Alfredo had arranged for a forklift, and unloading went fairly smoothly with the help of Vincenzo. This was late October, and the transmitter would be in storage for several weeks, until we could get together for the installation work. At this point, we had no on-air target date set. Meanwhile, the Italian power company, ENEL, had already installed the 3-phase, 380-volt, 25 kW line. Now, the rest was up to us.

On the Air in Two Days

It was Thursday, November 17, and Alfredo and I had taken two days off to help install the station, making it a four-day weekend. The notorious fog of the Po Valley was setting in, even in the early afternoon. After several preliminary trips to transport raw materials and equipment during previous weekends, I now knew the route to the farm pretty well. Alfredo was already there, and we got to work immediately.

The first thing we had to do was wire the control and transmitter rooms, as well as install inside and outside lighting. Of course, a separate line for the transmitter proper had to be brought in from outside as well. But all of this went surprisingly fast, and we finished just after dark. Good thing, because it was getting cold, and we were glad for the portable radiator we had brought along (it’s still in use)!

The great moment came when we fired up

TX 19 for the first time. It made it to stand-by mode! But that only proved that the power supply was OK and that the transmitter’s vital circuitry was working. The next crucial step would be an actual on-air test. But first, we had to get the antenna in place. Alfredo and I had dinner at a local restaurant and made final plans. We knew that the next day would be an exciting and eventful one, and we couldn’t wait!

Antenna-Raising Party for Two

It was Saturday, November 19, bright and early, and it was cold. We had everything to build an omni-directional antenna, which we were committed to, since we had no specific target area in mind. Bob Thomann, an acknowledged antenna specialist in his own right, had suggested a simple, but effective, multi-band dipole with a sharp horizontal bend at the feed point. The antenna was to be operable on three bands: 75, 41 and 31 meters.

Quite revolutionary was our commitment to reduced-carrier single sideband modulation, “A3A”. This offered the advantages of SSB, but could be received on ordinary AM receivers. Roughly speaking, our 10 kW A3A signal would have the equivalent effectiveness of a 30



A close-up of antenna feeder (now only 2-band: 75 and 41 m)

kW standard, double sideband AM (A3) signal. In addition, I had bought a Datong RF clipper, which we modified for wideband audio. In short, we were doing everything technically possible to apply good old ham radio technology to a commercial scenario. I guess you could say that this was, indeed, a "super ham station"!

Bob Thomann had given me a small ICOM all-band transceiver to take along to test the antenna's SWR. Pruning three bands to resonance was a nightmare, believe me! But after a couple of hours, we had it down to almost 1:1 on all three bands. The crucial antenna installation had been completed, just as night fell. We were ready to go on the air!

Oh, What a Night!

On the advice of a prominent British DXer, we chose 3.945 MHz as our first frequency. Although out of band, we had been assured that it was "clean." Alfredo and I stood before TX 19, nearly shaking in anticipation. The heavy-duty coax cable was connected. The final had been installed and checked, and all systems were "go." One of us – I don't remember who – turned "the big switch," and the transmitter began its 60-second warm-up sequence. At about 1 minute 10 seconds, there was a "clunk." The high voltage had been applied. The transmitter was now in tune-up mode, and easily self-tuned in a matter of seconds. Another clunk, and we were on the air!

Alfredo hastily recorded a service announcement on a portable cassette machine. We programmed it to play every few minutes, al-



The farm at dusk

ternating with a music cassette. We took off into the fog to monitor the station. It was terrific – loud and clear! We were stupefied with joy and the sweet taste of success!

Alfredo called home from a nearby pay phone, and signal reports had already started to come into the answering machine from all over Europe, including as far away as Scandinavia!

We were both exhausted. Alfredo went

home, while I stayed in the "shack" playing music into the wee, wee hours. I was nearly falling asleep at the controls. It was time to call it a night.

I played a piece of sentimental Italian pop music – "Buona Notte." 60 seconds after it ended, I took TX 19 off the air.

The first IRRS broadcast had come to an end, but the adventure had just begun.

Tune in next month for Part 2.

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International Broadcasting in Times of Crisis

By Sarkis Garjarian
QSLs courtesy Gayle Van Horn

Imagine you are amidst a war conflict. There are no local media; no AM or FM radio, no TV, and no newspapers. Satellite and cable TV are an impossible dream. Advanced technology like a computer or the Internet are unknown in your world; their existence is like a mirage. Or perhaps you are in a region where there is local government-controlled media, but you have no trust in it because of an on-going conflict. As a result you are “starving” for news.

What would you do in such a desperate situation in order to get the truth? Turn to your shortwave radio, of course – often the only way out of such an information black-out.

“International radio works as a ‘lifeline’ for a great many listeners,” said Oliver Zoellner, Head of DW Media Research and Audience Correspondence. “It is generally observed that audiences for international radio grow in times of crises, then fall back to normal once the crisis is over. Cases in point are Ethiopia, Afghanistan, or the Balkans – and there are many more.”

The Big Three

Three of the most reliable international broadcasters are the British Broadcasting Corporation (BBC) World Service in London, the Voice of America (VOA) in Washington, D.C., and Deutsche Welle (DW) in Cologne, Germany. Why are they so important, espe-

cially to people living in zones of war and crisis? An answer to this question requires a closer look at their news operations and procedures.

International broadcasters have similarities in news production and broadcast operations. For example, the Voice of America Central News Division is responsible for gathering all reports from its correspondents around the world and preparing news-bulletins. These are made available for use to all the 53 language services on SNAP++, the in-house computer system for news and programs.

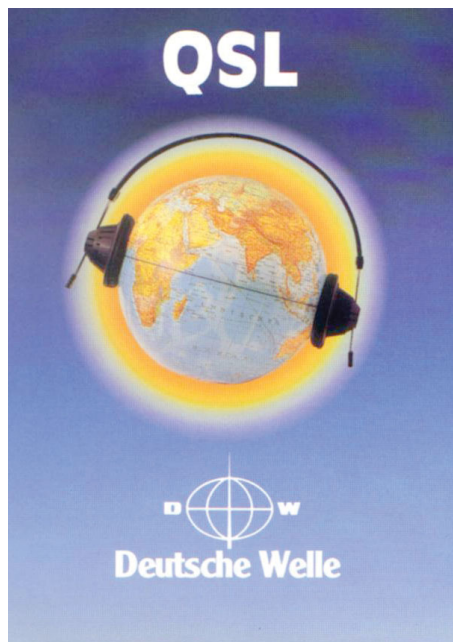
Each language service selects stories from the incoming material (correspondent reports, backgrounders, features, etc.) based on its relevance to the target audience. The text is then translated into the broadcast language and adapted for local listeners. Although the sta-

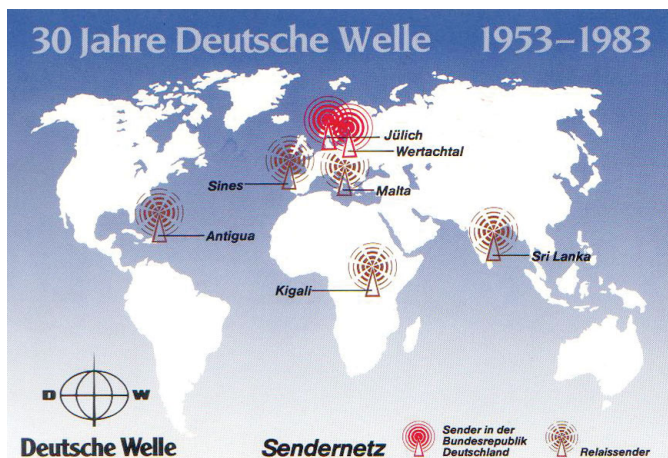
tions follow the pattern of “one voice in many languages,” each language service has its own stringers that provide local information. However, all language departments follow the overall editorial policy and agenda of its station. In addition, their integrity is ensured and protected through various decrees, mission statements, etc. The same principles are in effect when the stations report war conflicts.

The three international radio services have a major impact due to their large global audiences. BBC World Service broadcasts in 43 languages to an estimated audience of 150 million people weekly. VOA broadcasts in 53 languages and claims a weekly audience of 92 million listeners. DW-Radio reaches a weekly listening audience of about 30 million in 29 languages.

Reporting in a Hostile Environment

While DW relies almost entirely on wire services when reporting on wars, VOA and BBC have their own permanent staffs in war regions. As BBC European Regional editor, Mark Brayne said, “People who become correspondents tend to be fairly motivated individuals who come into journalism wanting to become correspondents. It is the very motivated members of the profession who find themselves in the position to be selected for foreign correspondents. The individuals who are in the field might find them-





selves in the war zone. In effect, the war comes to them.” As he explained, such a position is very demanding because “most of us don’t join the BBC in order to be a war reporter. It’s a combination of personal abilities, experience and, particularly, journalistic experience.”

“We have a good core of correspondents who have had experience in covering war zones,” VOA Assignments Chief Jack Payton said. “We have people in Israel, Cairo, Moscow, Hong Kong, Africa. Those are the people who we call when we have a war situation.”

Both the BBC and VOA provide training for their employees before they go on assignments in dangerous zones. “We [BBC] have a policy under which anybody who is being sent to a zone of conflict, or as we call it, a hostile environment, has to have the appropriate level of training,” Mark Brayne explained, who is also Director of DART Center Europe for Journalism and Trauma. “We have a policy that designates different hostile environments, such as category one – when there is an imminent danger for their lives, or category two – when hostility might burst out,” he added. Every correspondent should attend at least a six-day training course on coping in hostile environments, military awareness, and first aid. Any BBC journalist going to a category one hostile environment has to have a high-level formal approval.

“As far as the support of the media is concerned, the BBC is easily the best employer in the world,” according to BBC correspondent David Loyn¹. Payton added that all of the VOA correspondents that are likely to be involved in war coverage have also been trained by two British companies.

In some cases, journalists reporting from war zones find themselves reporting from a foreign-language environment. That’s when they hire native people, known as fixers, who in many cases are experienced local journalists. They serve as translators, set up interviews, obtain information from local sources, and are treated as very reliable contributors.

Although both organizations always have correspondents working in the thick of war conflicts, personal safety is always taken into consideration. “We generally tell our correspondents no story is worth getting killed for, and to take all precautions,” Payton said. “We tell them not to take unnecessary risk.” Even BBC guidelines state clearly: “No story is worth risking your life for.”

Policy Differences

Both the BBC World Service and VOA broadcast the news internationally. However, the Voice also presents the U.S. perspective in the news. In addition, the editorials express the opinion of the U.S. Government. They are prepared by the Office of Policy, and the editorial writing procedure has nothing to do with the VOA News operations.

Deutsche Welle focuses on European and German perspectives. “DW endeavors to provide programs to conflict areas which contain the basic information about that conflict from a non-biased standpoint,” Grahame Lucas, Head of Current Affairs at the DW English Service said. “We also try to include international reactions and views of that conflict. The idea is that in this way we can provide information not otherwise accessible to the people in the country concerned. This, we hope, will help them to form their own views on the conflict, rather than accept the propaganda of the warring parties.”

None of the three radio stations is involved in any peace propaganda, except for the Voice of America which adds an editorial. BBC’s Mark Brayne argues that “a world which has access to decent, fair and accurate information and debate is, in my view, probably less likely on balance to need to go to war. To that extent, our broadcasts do ultimately support the processes that lead more to peace than to war. But, no, we do not involve ourselves (consciously at any rate) in any kind of propaganda, either peace or war. What we do try to do is reflect the positions of the people on whose conflicts we report – and that might sometimes be interpreted by different parties in different ways.”

Maintaining Objectivity

The language services play a very important role in building up a station’s reputation as they are directly involved in the final step of news production by delivering and presenting the information to local audiences. According to correspondent David Loyn who covered Afghanistan in 2001, the BBC “was the main source of independent journalism in Afghanistan, actually the only source of journalism. So whenever you go, people know who you are by name, because they’ve heard your reports translated by the Pashto Service.”¹

“I am not aware of any of our language services taking sides in a crisis or distorting facts and consider that to be out of the question,” DW’s Grahame Lucas said. But BBC language services are evaluated on a regular basis. VOA also controls its language services, especially in times of crisis, to make sure no incorrect information goes out. Such is the case with the VOA Central and South Asia

language services which followed strictly what the News Division was putting out during the Afghan crisis.

Earlier this year Radio Sawa, the restructured VOA Arabic Service, launched a 24-hour radio network under its parent-entity, the International Broadcasting Bureau. Although it does not use any VOA news and correspondent material, Radio Sawa adheres to the VOA Charter, according to James Hooper, staff director of the network.

And the Beat Goes On

In a possible attack against Iraq, the stations say they will keep up their efforts as they did in other situations. As Mark Brayne of the BBC said, “We will continue to do our best to provide balanced, rounded information that allows our listeners – wherever they are – to come to their own informed conclusions about what is happening. Our Arabic service already provides 24-hour-a-day coverage, and will obviously devote special attention to the story, bringing together representatives of all parties to the conflict, including the Iraqi side.”

VOA’s Payton said, “we will cover it the same way as any other network or newspaper would do.” VOA News will send reporters to wherever the U.S. military sets up shop. He explained that correspondents would be based throughout the region, including Israel, and other parts of the Arab world to follow their reactions.

Among the four regional streams, Radio Sawa has an Iraqi stream going on the air 5 hours a day. Its broadcasts include news, targeted to listeners in the country, press reviews, Iraqi and Kurdish music, and other information. The network intends to provide the most accurate coverage during any possible strikes.

International broadcasting will continue to have its own future as long as there are conflicts and crises going on, in order to keep its listeners abreast of all the developments in their region and abroad. In such crises, radio stations increase the number of shortwave and mediumwave frequencies and the number of hours broadcast in local languages to turbulent regions, in order to make objective information more accessible to listeners.

¹ Olah, Krassimira. “Afghanistan: The Correspondents War,” Media Development Center, Sofia, 2002. Reprinted with permission of the author.

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How to Find Cool Utility Frequencies

By Jim Elvidge, N3APY

So you've unpacked your new general coverage radio. You hooked it up to a nice long wire antenna and you're ready to go. What to listen to? The shortwave broadcast stations are kind of cool – and a great introduction to the hobby. But maybe what you really want to listen to are the utility stations. Embassies. Military operations. Spies. Maybe that's what you bought the darn thing for.

Unfortunately, unless you are also blessed with a great deal of patience, you may be a little disappointed at the outset to find that the promise of James-Bond-esque communications is not quite so straightforward. First of all, most anything of a highly secret nature is encrypted and impossible to decode for us mere mortals.

However, a quick glance at *Monitoring Time's* monthly utility logs shows that there is indeed some exciting listening out there. Every month you'll see reports of military communications, FEMA drills, Israeli intelligence operations, and the like. Those frequencies are certainly a good place to start.

But if you pick one, you may listen for hours without hearing anything at all. This is not surprising. Most utility frequencies are only in use for a very small fraction of the time. So what do you do?

A common listening technique is simply to select a band of interest and manually tune through the band. Table 1 shows a simplified set of bands for various types of service that you will find in the shortwave spectrum. Allocations actually vary across different regions of the world and this chart is biased for North America, but it also doesn't differ much in Europe.

Some of the bands are actually subdivided into sub-bands. The 8100-8815 Maritime band, for example, is broken down as follows:

8100-8191: Thirty-one USB (upper sideband) ship/shore and shore/ship channels
 8195-8288: Thirty-two USB ship transmitting channels; paired with coast station channels (see 8719-8812)
 8291: Distress channel
 8302-8338: Ten ship channels for fax, data, and other transmissions
 8340.3-8341.5: Buoy telemetry
 8342-8376: Sixty-nine CW (continuous wave, or Morse code) ship channels

8377-8416: Seventy-nine ARQ (another form of data transmission) ship channels
 8417-8436: Forty ARQ coast channels
 8438-8707: CW coast stations
 8707-8716: Four USB simplex coast channels
 8719-8812: Thirty-seven USB duplex coast channels; pair with ship channels (see 8195-8288)

Why so many frequencies?

Notice that there are many different bands for each type of service. This is because of propagation. Daily fluctuations, yearly fluctuations, and sunspot cycles all add to the effect of varying radio propagation conditions throughout the spectrum. So each operator (e.g. embassy, maritime service, or military branch) will have multiple frequencies that get used during different conditions.

How do you know which band to listen to? To get an idea of how propagation changes and why some bands are more appropriate at a given time of day than others, simply tune to the standard time signals at 2500, 5000, 10000, 15000, or 20000 kHz. Most of us in North America will pick up station WWV at Fort Collins, CO. At each frequency, take note of the S-meter level on your radio. Since the time signals are broadcast in AM (amplitude modulation), they will remain relatively constant while you are listening. Pick the two frequencies that are strongest and restrict your tuning to the bands of interest between those frequencies.

You'll find that at night, the higher frequencies drop off and often you may not even hear the time signals. There is certainly no sense in listening in that section of the spectrum if there is no propagation! And, of course, during the day the reverse is true, and the lower frequency time signals will drop off.

If you want to listen to Maritime USB communications, checking the signal strength of the time signals, you get the following results: 2500-not heard, 5000-S7, 10000-S9, 15000-S5, 20000-

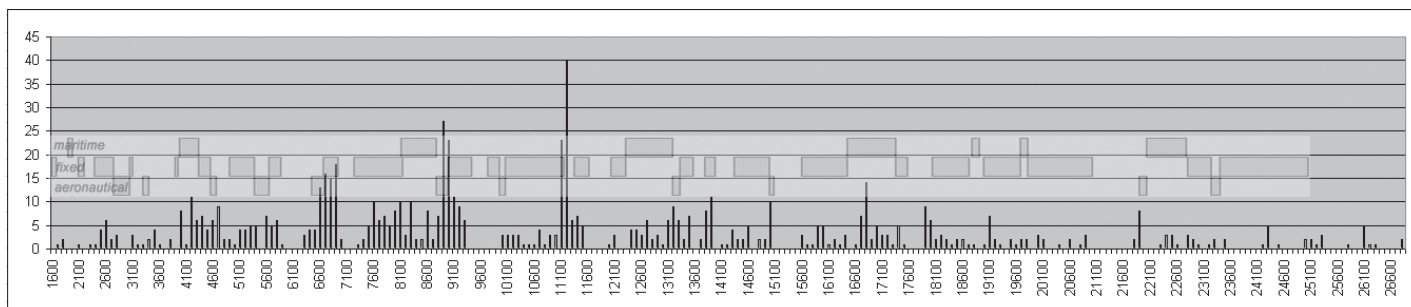
not heard. Since the time signals at 5000 and 10000 were the strongest, you should select a maritime band between 5000 and 10000, such as 8719-8812. This would be your best chance to hear shore/ship USB communications.

The problem with using the time signal stations for your only reference is that they will only tell you reception conditions for signals arriving from the direction of Colorado to your location. For global conditions, many amateurs and hobbyists use a worldwide network of high-frequency radio beacons on 14.100, 18.110, 21.150, 24.930, and 28.200 MHz. "With three minutes of listening for the beacons, one can find out either where a particular band is open or which band has the best propagation to a particular part of the world," says the sponsoring website. However, the ability to copy Morse code and knowledge of callsign locations and transmission schedules are also necessary. Consult <http://www.ncdxf.org/beacon.htm> for more tips and details.

An interesting exercise

The Fixed band, of course, is where a lot of the real gems are. Military operations, embassies and consulates, known spy organizations, scientific experiments, and more can be found here. The Fixed bands are not segmented and most of the frequencies are very infrequently used. So even using the technique above to pick the right band may not yield great results. But, you notice that every month, dozens of listen-

SERVICE	1600-4999	5000-9999	10000-14999	15000-19999	20000-30000
Aeronautical	2850-3155	5450-5730	10005-10100	15010-15100	21850-22000
	3400-3500	6525-6765	11175-11400	17900-18030	23200-23350
	4650-4750	8815-9040	13200-13360		
Amateur	1800-2000	7000-7300	10100-10150	18068-18168	21000-21450
	3500-4000		14000-14350		24890-24930 28000-29700
Broadcast	535-1705	5950-6200	11650-12050	15100-15600	21450-21850
		7100-7300	13360-13800	17550-17900	
		9500-9900			
Maritime	4063-4438	6200-6525	12330-13200	16460-17360	22000-22720
				18780-18900	25100-25210
				19680-19800	26100-26175
Fixed	1605-1800	5005-5480	10100-11175	15600-16460	20010-21000
	2000-2805	5730-5950	11400-11650	17360-17550	22720-23200
	3155-3400	6765-7000	12050-12330	18030-18780	23350-24990
	4000-4063	7300-8195	13800-14000	18900-19680	25100-25070
	4438-4650	9040-9500	14350-14995	19800-19990	
	4750-4995				
Time Signals	2500	5000	10000	15000	20000



ers report logs of utility stations, many of them of the Fixed Service variety.

Perhaps you don't have hours to spend listening to a single channel. Or thousands of dollars to spend on multi-channel scanning radios. But you can eliminate a lot of the guesswork with my handy utility histogram, shown in Figure 2. I took the time to enter many months worth of frequencies into a spreadsheet, all of which were taken directly from the utility logs in *Monitoring Times*. About 750 frequencies in all were entered. By creating hundreds of columns of spreadsheet cells with a special formula and creating one row per utility entry, I was able to sort all of the data into 100 kHz-wide segments. Then, I simply summed the segments across all utility entries and plotted the results. The histogram shows a vertical line for each 100 kHz frequency segment.

So, for example, the segment with the most

entries is 11200-11300, where there were 29 entries across 6 different months of utility logs. This segment happens to be right in the middle of the Aeronautical Service band and is heavily logged because of aeronautical weather stations that broadcast frequently.

Try it yourself!

By overlaying a utility band chart on top of Figure 2, you can see which segments are the best for listening to each type of service. If it is Fixed Services that interest you, for example, it looks like the best place to listen is between 6765 and 7000 kHz.

I have uploaded the spreadsheet to the following web page: <http://www.elvidge.com/users/jimbo/satradio/utilities.htm>.

I welcome anyone to download it and make use of it, or to make improvements to it. For example, it would be interesting to actually seg-

ment the frequencies into different utility bands to get a really accurate count of where the most action is. Or, the data could be supplemented with operating mode (CW, USB, etc.). Then, we could see, for example, which parts of the spectrum offered the best chance of picking up USB transmissions from Fixed Services, or RTTY from Coastal Maritime stations.

I also didn't include time of day in the spreadsheet entries. With that data, of course, you could really zone in on the right places to listen at any given time for any given interest. With enough data, you might even start to see trends (e.g. the British Consulate tends to operate just before the pubs open). The possibilities are limitless.

I hope this has helped a few people learn a few new listening techniques. Happy monitoring!

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Monitoring Times Guide to APCO P-25 Systems, Part 2

By Dan Veeneman

We continue the listing of APCO Project 25 (P-25) systems in the United States we began last month.

These listings are based on Federal Communications Commission (FCC) license records, and thus do not include military installations or systems operating in other countries. If you have additional information, corrections, updates or just a question or two, please send me an e-mail at dan@signalharbor.com or danveeneman@monitoringtimes.com. We are especially interested in talk group information.

Two-way radio systems can operate in one of two ways. The first is *conventional*, where a conversation takes place on a pre-assigned pair of radio frequencies. All participants in a conversation always transmit on one frequency and receive on another frequency. The frequency pairs are commonly assigned according to department or organization.

For instance, a small or medium-sized town may have licensed three pairs of frequencies from the FCC. The first pair may be assigned to the police department, the second pair to the fire department, and the third pair as a "tactical" channel for occasional use by either department. What this means for the scanner listener is that when there is activity on a particular frequency, it's a safe bet that the activity will always be from the same group of users. In our example, when a listener hears transmissions on the sec-

ond frequency pair, it's going to be related to the fire department.

The second method of operating is *trunked*, where a set of radio frequency pairs is shared among more than one group of users. These groups of users are identified with a number known as a *talkgroup*. When a member of group wants to communicate with other members, he or she presses the push-to-talk button on the radio. The radio then transmits a quick digital request to a control computer, identifying itself with the talkgroup number and asking for a channel (a frequency pair) assignment. The control computer checks all of the available, licensed frequencies and picks one that is not currently in use. It then sends a digital broadcast message out to everyone saying, basically, "Talkgroup X is now active on channel Y." All the radios that hear the message and are part of talkgroup X then tune to channel Y. In APCO P-25 systems, each of those digital messages – the request and the broadcast response – occur on what's called a *control channel*.

These control channels come in two flavors. The first is an older format, first developed by Motorola, which transmits digital information at a rate of 3600 baud. Older systems with analog radios typically use the 3600-baud control channel, since that's all the analog radios will support. The second flavor is a newer format, spelled out in the Project 25 specifications, which operates at 9600 baud. Every ra-

dio on the system has to be able to understand the format of the control channel, so 9600-baud systems are only found with systems that have gone totally digital. Such systems include the states of Colorado, Michigan, and Minnesota, as well as several counties and cities.

So, to summarize, there are four different combinations for a P-25 system. It can operate conventional or trunked, and it can either be all-digital voice or a mix of digital and analog voice.

According to Uniden information, the handheld BC250D and the base/mobile BC785D are able to follow three of the four possible types of APCO Project 25 systems. The units are not able to track trunked transmissions in those systems that use a 9600 baud control channel.

Ability to Decode

Uniden Scanners with Mixed Analog and Digital Voice Digital Voice Only	Digital Card	
	Conventional	Trunked
	Yes	Yes
	Yes	No

There are currently a handful of P-25 installations that use 9600-baud control channels, including systems in Colorado, Michigan, Minnesota, Texas and Virginia. In these cases the scanner will decode the audio but will not be able to follow a trunked conversation.

FLORIDA (CONT.)

Call Sign WPMF866, Granted 07/09/1998.

TAMPA (HILLSBOROUGH COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

PINECREST (HILLSBOROUGH COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

TAMPA (HILLSBOROUGH COUNTY), FLORIDA

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854.2875, 854.3125 MHz

RUSKIN (HILLSBOROUGH COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
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854.2875, 854.3125 MHz

PLANT CITY (HILLSBOROUGH COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

LUTZ (HILLSBOROUGH COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

Call Sign WPMF867, Granted 07/09/1998.

TAMPA (HILLSBOROUGH COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
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854.2875, 854.3125 MHz

ST. PETERSBURG (PINELLAS COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
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LARGO (PINELLAS COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
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854.2875, 854.3125 MHz

TARPON SPRINGS (PINELLAS COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
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854.2875, 854.3125 MHz

PALM HARBOR (PINELLAS COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

Call Sign WPMF868, Granted 07/09/1998.

CAPE CORAL (LEE COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

BONITA SPRINGS (LEE COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

PINE ISLAND (LEE COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

BABCOCK (CHARLOTTE COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

Call Sign WPMF869, Granted 07/09/1998.

BUSHNELL (SUMTER COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

FIVAY JUNCTION (PASCO COUNTY), FLORIDA

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,

853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,

JACKSONVILLE (DUVAL COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,

GAINESVILLE (ALACHUA COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
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853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
HIGH SPRINGS (ALACHUA COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
MELROSE (PUTNAM COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
MELROSE (PUTNAM COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

Call Sign WPMP538, Granted 10/26/1998.

CRESTVIEW (OKALOOSA COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
DESTIN (WALTON COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
LAUREL HILL (OKALOOSA COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
HOLT (OKALOOSA COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
FT WALTON BEACH (OKALOOSA COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

Call Sign WPMP628, Granted 10/27/1998.

MONTICELLO (JEFFERSON COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
WAUKEENAH (JEFFERSON COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
TALLAHASSEE (LEON COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
TALLAHASSEE (LEON COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
PANACEA (FRANKLIN COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

Call Sign WPMP629, Granted 10/27/1998.

PANAMA CITY (BAY COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
PANAMA CITY (BAY COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
MEXICO BEACH (GULF COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
WEST BAY (BAY COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875 MHz

Call Sign WPMP800, Granted 10/29/1998.

NUTALL RISE (JEFFERSON COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,

854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
VEREEN (WAKULLA COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
MONTICELLO (JEFFERSON COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
MIDWAY (GADSDEN COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

Call Sign WPM921, Granted 10/29/1998.

FOUNTAIN (BAY COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
CLARKSVILLE (CALHOUN COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
WEWAHITCHKA (GULF COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

PT ST JOE (FRANKLIN COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
BONIFAY (HOLMES COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

Call Sign WPMQ541, Granted 11/05/1998.

MARIANNA (JACKSON COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
NEW HOPE (WASHINGTON COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz
GILBERTS MILL (WASHINGTON COUNTY), FLORIDA
853.8375, 853.8625, 853.8875, 853.9125, 853.9375, 853.9625,
853.9875, 854.0125, 854.0375, 854.0625, 854.0875, 854.1125,
854.1375, 854.1625, 854.1875, 854.2125, 854.2375, 854.2625,
854.2875, 854.3125 MHz

Call Sign WPQE387, Granted 06/12/2000.

FT PIERCE (ST. LUCIE COUNTY), FLORIDA
808.8625, 809.1875 MHz
Call Sign WPQE390, Granted 06/12/2000.
OVIDEO (SEMINOLE COUNTY), FLORIDA
809.0625, 809.3125 MHz
Call Sign WPMQH929, Granted 07/24/2000.
OVIDEO (SEMINOLE COUNTY), FLORIDA
821.4500, 821.4875, 821.9500, 821.9875, 822.4500, 822.4875,
822.9500, 822.9875, 823.4375, 823.4625, 823.4875, 823.9375,
823.9625 MHz

Call Sign WPMQH930, Granted 07/24/2000.

FORT PIERCE (ST. LUCIE COUNTY), FLORIDA
821.4375, 821.4625, 821.4875, 821.9375, 821.9625, 821.9875,
822.4375, 822.4625, 822.4875, 822.9375, 822.9625, 822.9875,
823.4375, 823.4625, 823.4875, 823.9375, 823.9625, 823.9875 MHz

ILLINOIS

CHICAGO

Call Sign WNAJ329, Granted 02/23/2001.

CHICAGO (COOK COUNTY), ILLINOIS
856.7625, 857.7625, 858.7625, 859.7125, 859.7625, 860.7125,
860.7625 MHz
CHICAGO (COOK COUNTY), ILLINOIS
856.7625, 857.7625, 858.7625, 859.7125, 859.7625, 860.7125,
860.7625 MHz
Call Sign WNDW413, Granted 01/10/2000.
CHICAGO (COOK COUNTY), ILLINOIS
856.9375, 857.9375, 858.9375, 859.9375, 860.9375, 865.8875,
865.9125 MHz

Call Sign WPKY459, Granted 07/12/2002.

CHICAGO (COOK COUNTY), ILLINOIS
476.3125, 476.5625, 476.7875, 477.0875, 477.4125, 477.6375 MHz

COOK COUNTY

Call Sign WPEV426, Granted 05/10/1999.

CHICAGO (COOK COUNTY), ILLINOIS
866.1375, 866.3125, 866.5375, 866.7875, 867.2250, 867.7125,
868.1250, 868.5000, 868.8375 MHz
NILES (COOK COUNTY), ILLINOIS
866.1375, 866.3125, 867.2250, 868.1250 MHz
HOMewood (COOK COUNTY), ILLINOIS
866.1375, 866.3125, 867.2250, 868.1250 MHz

ILLINOIS, STATE

Call Sign WNSS257, Granted 09/06/2000.

CHICAGO HEIGHTS (COOK COUNTY), ILLINOIS
866.4125, 866.4375, 866.9375, 867.4125, 867.9125, 867.9375,
868.4125, 868.4375, 868.9125, 868.9375 MHz
CHICAGO (COOK COUNTY), ILLINOIS
866.0125, 866.4125, 866.4375, 866.4625, 866.5125, 866.8875,
866.9375, 866.9625, 867.0125, 867.3875, 867.4125, 867.4625,
867.5125, 867.8875, 867.9125, 867.9375, 868.0125, 868.3875,
868.4125, 868.4375, 868.4625, 868.8875, 868.9125, 868.9375,
868.9625 MHz
ELGIN (KANE COUNTY), ILLINOIS
866.4625, 866.8875, 866.9625, 867.3875, 867.4625, 867.8875,
868.3875, 868.4625, 868.8875, 868.9625 MHz
EAST DUNDEE (KANE COUNTY), ILLINOIS
866.4625, 866.8875, 866.9625, 867.3875, 867.4625, 867.8875,
868.3875, 868.4625, 868.8875, 868.9625 MHz
DES PLAINES (COOK COUNTY), ILLINOIS
866.4625, 866.8875, 866.9625, 867.3875, 867.4625, 867.8875,
868.3875, 868.4625, 868.8875, 868.9625 MHz
ARGONNE (DU PAGE COUNTY), ILLINOIS
866.4125, 866.4375, 866.9375, 867.4125, 867.9125, 867.9375,
868.4125, 868.4375, 868.9125, 868.9375 MHz

Call Sign WPF638, Granted 09/14/1999.

HEROD (POPE COUNTY), ILLINOIS
855.2125, 856.2125, 857.2125, 858.2125, 859.2125, 860.2125 MHz
CYPRESS (JOHNSON COUNTY), ILLINOIS
855.2125, 856.2125, 857.2125, 858.2125, 859.2125, 860.2125 MHz
EDWARDSVILLE (MADISON COUNTY), ILLINOIS
855.2125, 856.2125, 857.2125, 858.2125, 859.2125, 860.2125 MHz
EATON (CRAWFORD COUNTY), ILLINOIS
855.2125, 856.2125, 857.2125, 858.2125, 859.2125, 860.2125 MHz
SWANWICK (PERRY COUNTY), ILLINOIS
855.2125, 856.2125, 857.2125, 858.2125, 859.2125, 860.2125 MHz
CARM (WHITE COUNTY), ILLINOIS
855.2125, 856.2125, 857.2125, 858.2125, 859.2125, 860.2125 MHz
Call Sign WPF639, Granted 09/14/1999.
STOCKTON (JO DAVISS COUNTY), ILLINOIS
855.2125, 856.2125, 857.2125, 858.2125, 859.2125, 860.2125 MHz
ANDOVER (HENRY COUNTY), ILLINOIS
855.2125, 856.2125, 857.2125, 858.2125, 859.2125, 860.2125 MHz
EAST FORT MADISON (HANCOCK COUNTY), ILLINOIS
855.2125, 856.2125, 857.2125, 858.2125, 859.2125, 860.2125 MHz
LEROY (MCLEAN COUNTY), ILLINOIS
855.2125, 856.2125, 857.2125, 858.2125, 859.2125, 860.2125 MHz
PITTSFIELD (PIKE COUNTY), ILLINOIS
855.2125, 856.2125, 857.2125, 858.2125, 859.2125, 860.2125 MHz
STRASBURG (SHELBY COUNTY), ILLINOIS
855.2125, 856.2125, 857.2125, 858.2125, 859.2125, 860.2125 MHz

Call Sign WPHS867, Granted 02/16/2001.

PONTIAC (LIVINGSTON COUNTY), ILLINOIS
855.7125, 856.7125, 857.7125, 858.7125 MHz

Call Sign WPKW428, Granted 05/21/2002.

DIXON (LEE COUNTY), ILLINOIS
855.7125, 856.7125, 857.7125, 858.7125 MHz

Call Sign WPKX554, Granted 07/23/1999.

JOLIET (WILL COUNTY), ILLINOIS
856.7125, 856.9625, 858.9875, 859.9875 MHz

Call Sign WPLR422, Granted 10/01/2002.

CHESTER (RANDOLPH COUNTY), ILLINOIS
856.2625, 857.2625, 858.2625, 859.2625, 860.2625 MHz

Call Sign WPLT988, Granted 01/19/1999.

TAMMS (ALEXANDER COUNTY), ILLINOIS
856.4875, 857.4875, 858.4875, 859.4875 MHz

Call Sign WPMR362, Granted 11/17/1998.

LINCOLN (LOGAN COUNTY), ILLINOIS
856.2375, 856.9375, 857.9375, 858.7375, 859.7375, 860.7375 MHz

Call Sign WPMV426, Granted 01/26/1999.

DANVILLE (VERMILION COUNTY), ILLINOIS
854.9625, 855.7125, 859.2625, 860.2625 MHz

ARGENTA (MACON COUNTY), ILLINOIS
856.4375, 856.9625, 857.4375, 858.4375, 859.4375, 860.4375 MHz

TOWER HILL (SHELBY COUNTY), ILLINOIS
855.7125, 856.7125, 857.7125, 858.7125, 859.7125, 860.7125 MHz

PARIS (EDGAR COUNTY), ILLINOIS
856.9875, 857.2625, 857.9875, 858.9875, 859.9875, 860.9875 MHz

MATTOON (COLES COUNTY), ILLINOIS
858.2625, 858.7375, 859.7375, 860.7375 MHz

Call Sign WPNQ269, Granted 04/29/1999.

DWIGHT (LIVINGSTON COUNTY), ILLINOIS
854.9875, 855.4625, 855.9875, 856.2625 MHz

Call Sign WPNY601, Granted 08/03/1999.

855.2375, 855.9625, 856.2375, 858.9625 MHz
Call Sign WPPA939, Granted 09/29/1999.
JOLIET (WILL COUNTY), ILLINOIS
867.4875, 867.9875, 868.3625, 868.4875, 868.8625, 868.9875 MHz
Call Sign WPPD278, Granted 10/29/1999.
KEWANEE (HENRY COUNTY), ILLINOIS
856.9375, 857.9375, 859.9375, 860.9375 MHz
Call Sign WPG6399, Granted 07/05/2000.
HILLSBORO (MONTGOMERY COUNTY), ILLINOIS
855.9625, 857.2625, 858.2625, 860.2625 MHz
Call Sign WPSH276, Granted 04/24/2001.
SUMNER (LAWRENCE COUNTY), ILLINOIS
855.2375, 855.7125, 855.9625, 858.9625 MHz
Call Sign WPSN616, Granted 06/28/2001.
THOMSON (CARROLL COUNTY), ILLINOIS
855.9875, 856.4875, 857.9875, 859.9875 MHz

INDIANA

INDIANA, STATE (IPSC)
Call Sign WPJP476, Granted 11/26/2001.
NORTH MADISON (JEFFERSON COUNTY), INDIANA
856.9625, 857.9625, 858.9625, 859.9625, 860.9625, 866.0125, 866.5125, 867.0125, 867.5125, 868.0125, 868.6125, 868.8625 MHz
Call Sign WPTF965, Granted 09/25/2001.
MOORESVILLE (MORGAN COUNTY), INDIANA
854.9625, 866.9000, 867.4250, 867.9750, 868.4750, 868.8625 MHz
FRANKLIN (JOHNSON COUNTY), INDIANA
866.4750, 867.0375, 867.3750, 867.4750, 867.9000, 868.3750, 868.4500, 868.9000, 868.9750 MHz
VERSAILLES (RIPLEY COUNTY), INDIANA
855.7125, 866.4250, 866.9500, 867.4750, 868.3875 MHz
PEPPERTOWN (FRANKLIN COUNTY), INDIANA
859.7125, 866.8625, 867.3625, 867.8750 MHz
Call Sign WPUE619, Granted 02/19/2002.
NORTH MADISON (JACKSON COUNTY), INDIANA
868.8625 MHz
PATRIOT (SWITZERLAND COUNTY), INDIANA
866.8875 MHz
Call Sign WPUQ786, Granted 04/16/2002.
MOORESVILLE (MORGAN COUNTY), INDIANA
854.9625, 866.0125, 866.5125, 866.9000, 867.0125, 867.4250, 867.5125, 867.9750, 868.0125, 868.4750, 868.8625 MHz
FRANKLIN (JOHNSON COUNTY), INDIANA
866.0125, 866.4750, 866.5125, 867.0125, 867.0375, 867.3750, 867.4750, 867.5125, 867.9000, 868.0125, 868.3750, 868.4500, 868.9000, 868.9750 MHz
VERSAILLES (RIPLEY COUNTY), INDIANA
855.7125, 866.0125, 866.4250, 866.5125, 866.9500, 867.0125, 867.4750, 867.5125, 868.3875 MHz
PEPPERTOWN (FRANKLIN COUNTY), INDIANA
859.7125, 866.0125, 866.5125, 866.8625, 867.0125, 867.3625, 867.5125, 867.8750, 868.0125 MHz
Call Sign WPPN656, Granted 07/22/2002.
CRAWFORDSVILLE (MONTGOMERY COUNTY), INDIANA
866.4875, 866.8875, 867.4125, 867.9375, 868.4625, 868.9875 MHz

LOUISIANA

JEFFERSON PARISH
Call Sign KNJA737, Granted 01/22/1998.
MARRERO (JEFFERSON COUNTY), LOUISIANA
852.3375, 852.8375, 853.3375, 853.6375, 853.8375, 854.2125, 854.3375, 856.4875, 856.7375, 856.9875, 857.4875, 857.7375, 857.9875, 858.4875, 858.7375, 858.9875, 859.4875, 859.7375, 859.9875, 860.4875, 860.7375, 860.9875 MHz
METAIRIE (JEFFERSON COUNTY), LOUISIANA
852.3375, 852.8375, 853.3375, 853.6375, 853.8375, 854.2125, 854.3375, 856.4875, 856.7375, 856.9875, 857.4875, 857.7375, 857.9875, 858.4875, 858.7375, 858.9875, 859.4875, 859.7375, 859.9875, 860.4875, 860.7375, 860.9875 MHz
Call Sign WPGP269, Granted 04/26/2000.
GRETNA (JEFFERSON COUNTY), LOUISIANA
866.1375, 866.1625, 866.2875, 866.5625, 866.5875, 866.6875, 866.9875, 867.0375, 867.0875, 867.3625, 867.4250, 867.6375, 867.7375, 868.1625, 868.3250, 868.3750, 868.4750, 868.8500, 868.9000, 868.9750 MHz
METAIRIE (JEFFERSON COUNTY), LOUISIANA
866.1375, 866.1625, 866.2875, 866.5625, 866.5875, 866.6875, 866.9875, 867.0375, 867.0875, 867.3625, 867.4250, 867.6375, 867.7375, 868.1625, 868.3250, 868.3750, 868.4750, 868.8500, 868.9000, 868.9750 MHz
LAFITTE (JEFFERSON COUNTY), LOUISIANA
866.1375, 866.1625, 866.2875, 866.5625, 866.5875, 866.6875, 866.9875, 867.0375, 867.0875, 867.3625, 867.4250, 867.6375, 867.7375, 868.1625, 868.3250, 868.3750, 868.4750, 868.8500, 868.9000, 868.9750 MHz
GRAND ISLE (JEFFERSON COUNTY), LOUISIANA
866.1375, 866.1625, 866.2875, 866.5625, 866.5875, 866.6875, 866.9875, 867.0375, 867.0875, 867.3625, 867.4250, 867.6375, 867.7375, 868.1625, 868.3250, 868.3750, 868.4750, 868.8500,

868.9000, 868.9750 MHz

MARYLAND

BALTIMORE
Call Sign WNPY725, Granted 05/28/1998.
BALTIMORE, MARYLAND (Four sites)
866.1125, 866.2000, 866.2250, 866.3500, 866.4375, 866.6250, 866.6625, 866.8250, 866.8500, 866.8750, 866.9000, 866.9375, 867.1500, 867.1750, 867.2125, 867.4000, 867.4375, 867.4625, 867.8250, 867.9000, 867.9250, 867.9875, 868.1000, 868.1250, 868.1500, 868.1750, 868.2000, 868.3000, 868.4500, 868.5625, 868.6250, 868.7000, 868.7375, 868.8750, 868.9500 MHz

BALTIMORE COUNTY
Call Sign WNWV281, Granted 12/02/1999.
TOWSON (BALTIMORE COUNTY), MARYLAND
852.8125, 853.2125, 853.5625, 853.8375, 854.2125 MHz

MONTGOMERY COUNTY
Call Sign WPBQ368, Granted 04/16/1998.
WHEATON (MONTGOMERY COUNTY), MARYLAND
866.2125, 866.3375, 866.4875, 866.6500, 866.8875, 867.3250, 867.3500, 867.4625, 867.8375, 868.1125, 868.2750, 868.3625, 868.3875, 868.4375, 868.6125, 868.6375, 868.6875, 868.8625, 868.8875, 868.9375 MHz
Call Sign WPTF473, Granted 03/07/2002.
Silver Spring (MONTGOMERY COUNTY), MARYLAND
866.2125, 866.2750, 866.3375, 866.4875, 866.6500, 867.7375, 867.8375, 867.8875, 867.9125, 868.1125, 868.1625, 868.2750, 868.3625, 868.3875, 868.4375, 868.6125, 868.6375, 868.6875, 868.8625, 868.8875, 868.9375 MHz
Germantown (MONTGOMERY COUNTY), MARYLAND
866.2125, 866.2750, 866.3375, 866.4875, 866.6500, 867.7375, 867.8375, 867.8875, 867.9125, 868.1125, 868.1625, 868.2750, 868.3625, 868.3875, 868.4375, 868.6125, 868.6375, 868.6875, 868.8625, 868.8875, 868.9375 MHz
Silver Spring (MONTGOMERY COUNTY), MARYLAND
866.2125, 866.2750, 866.3375, 866.4875, 866.6500, 867.7375, 867.8375, 867.8875, 867.9125, 868.1125, 868.1625, 868.2750, 868.3625, 868.3875, 868.4375, 868.6125, 868.6375, 868.6875, 868.8625, 868.8875, 868.9375 MHz
Boyd's (MONTGOMERY COUNTY), MARYLAND
866.0125, 866.2125, 866.2750, 866.3375, 866.4875, 866.6500, 867.7375, 867.8375, 867.8875, 867.9125, 868.1125, 868.1625, 868.2750, 868.3625, 868.3875, 868.4375, 868.6125, 868.6375, 868.6875, 868.8625, 868.8875, 868.9375 MHz
Mount Airy (HOWARD COUNTY), MARYLAND
866.2125, 866.2750, 866.3375, 866.4875, 866.6500, 867.7375, 867.8375, 867.8875, 867.9125, 868.1125, 868.1625, 868.2750, 868.3625, 868.3875, 868.4375, 868.6125, 868.6375, 868.6875, 868.8625, 868.8875, 868.9375 MHz
GAITHERSBURG (MONTGOMERY COUNTY), MARYLAND
866.2125, 866.2750, 866.3375, 866.4875, 866.6500, 867.7375, 867.8375, 867.8875, 867.9125, 868.1125, 868.1625, 868.2750, 868.3625, 868.3875, 868.4375, 868.6125, 868.6375, 868.6875, 868.8625, 868.8875, 868.9375 MHz
Call Sign WPTI348, Granted 03/07/2002.
Dickerson (MONTGOMERY COUNTY), MARYLAND
866.2125, 866.2750, 866.3375, 866.4875, 866.6500, 867.7375, 867.8375, 867.8875, 867.9125, 868.1125, 868.1625, 868.2750, 868.3625, 868.3875, 868.4375, 868.6125, 868.6375, 868.6875, 868.8625, 868.8875, 868.9375 MHz
Bethesda (MONTGOMERY COUNTY), MARYLAND
866.2125, 866.2750, 866.3375, 866.4875, 866.6500, 867.7375, 867.8375, 867.8875, 867.9125, 868.1125, 868.1625, 868.2750, 868.3625, 868.3875, 868.4375, 868.6125, 868.6375, 868.6875, 868.8625, 868.8875, 868.9375 MHz
Rockville (MONTGOMERY COUNTY), MARYLAND
866.2125, 866.2750, 866.3375, 866.4875, 866.6500, 867.7375, 867.8375, 867.8875, 867.9125, 868.1125, 868.1625, 868.2750, 868.3625, 868.3875, 868.4375, 868.6125, 868.6375, 868.6875, 868.8625, 868.8875, 868.9375 MHz
Takoma Park (PRINCE GEORGE'S COUNTY), MARYLAND
866.2125, 866.2750, 866.3375, 866.4875, 866.6500, 867.7375, 867.8375, 867.8875, 867.9125, 868.1125, 868.1625, 868.2750, 868.3625, 868.3875, 868.4375, 868.6125, 868.6375, 868.6875, 868.8625, 868.8875, 868.9375 MHz
Germantown (MONTGOMERY COUNTY), MARYLAND
866.2125, 866.2750, 866.3375, 866.4875, 866.6500, 867.7375, 867.8375, 867.8875, 867.9125, 868.1125, 868.1625, 868.2750, 868.3625, 868.3875, 868.4375, 868.6125, 868.6375, 868.6875, 868.8625, 868.8875, 868.9375 MHz

Upper Maryland Eastern Shore Consortium
Call Sign WPSG976, Granted 04/23/2001.
TRAPPE (TALBOT COUNTY), MARYLAND
866.5875, 866.7000, 866.8000, 866.9750, 867.5750, 868.4250, 868.4750, 868.5250, 868.6750, 868.9875 MHz
EASTON (TALBOT COUNTY), MARYLAND
866.5875, 866.7000, 866.8000, 866.9875, 867.5750, 868.4250, 868.4750, 868.5250, 868.6750, 868.9875 MHz
STEVENSVILLE (QUEEN ANNE'S COUNTY), MARYLAND
866.5875, 866.7000, 866.8000, 866.9750, 867.5750, 868.4250, 868.4750, 868.5250, 868.6750, 868.9875 MHz

WYE MILLS (QUEEN ANNE'S COUNTY), MARYLAND
866.5875, 866.7000, 866.8000, 866.9750, 867.5750, 868.4250, 868.4750, 868.5250, 868.6750, 868.9875 MHz
SUDLERSVILLE (QUEEN ANNE'S COUNTY), MARYLAND
866.5875, 866.7000, 866.8000, 866.9750, 867.5750, 868.4250, 868.4750, 868.5250, 868.6750, 868.9875 MHz

MICHIGAN

DOWNRIVER MUTUAL AID
Call Sign WPIU702, Granted 04/02/2001.
RIVERVIEW (WAYNE COUNTY), MICHIGAN
866.5750, 866.6250, 867.1250, 867.2000, 867.2625, 867.5750, 867.7750, 867.8000, 867.8250, 868.0750, 868.1000, 868.1250, 868.3375, 868.5875, 868.6500, 868.7500, 868.8375 MHz
TAYLOR (WAYNE COUNTY), MICHIGAN
866.5750, 867.0500, 867.1250, 867.2000, 867.2625, 867.5750, 867.7750, 867.8000, 867.8250, 868.0750, 868.1000, 868.1250, 868.3375, 868.5875, 868.6500, 868.7500, 868.8375 MHz
ECORSE (WAYNE COUNTY), MICHIGAN
866.5750, 866.6250, 867.1250, 867.2000, 867.2625, 867.5750, 867.7750, 867.8000, 867.8250, 868.0750, 868.1000, 868.1250, 868.3375, 868.5875, 868.6500, 868.7500, 868.8375 MHz
FLAT ROCK (WAYNE COUNTY), MICHIGAN
866.5750, 866.6000, 867.1250, 867.2000, 867.2625, 867.5750, 867.7750, 867.8000, 867.8250, 868.0750, 868.1000, 868.1250, 868.3375, 868.5875, 868.6500, 868.7500, 868.8375 MHz

Detroit
Call Sign WPSJ369, Granted 05/17/2001.
DETROIT (WAYNE COUNTY), MICHIGAN
866.7000, 867.0750, 867.0875, 867.1125, 867.1625, 867.2125, 867.2250, 867.2875, 867.3375, 867.6000, 867.6125, 867.7125, 867.8125, 867.8375, 868.1625, 868.2125, 868.2375, 868.2500, 868.5000, 868.5375, 868.6250, 868.6625, 868.6875, 868.7125, 868.7250 MHz

GROSSE POINTE FARMS
Call Sign WPSK642, Granted 06/04/2001.
GROSSE POINTE ROAD (WAYNE COUNTY), MICHIGAN
866.5375, 866.8500, 867.1500, 867.6250, 868.0875, 868.5000 MHz

LANSING
Call Sign WPEI830, Granted 01/25/1999.
LANSING (INGHAM COUNTY), MICHIGAN
851.4875, 852.4875, 853.4875, 854.4875, 855.4875 MHz
Call Sign WPPV909, Granted 06/20/2002.
LANSING (INGHAM COUNTY), MICHIGAN
851.4875, 852.4875, 853.4875, 854.4875, 855.4875 MHz

MICHIGAN, STATE
Call Sign KNN6860, Granted 01/04/2001.
OWOSSO (SHIAWASSEE COUNTY), MICHIGAN
866.0125, 866.4375, 866.9375, 867.4375, 867.9375, 868.4375, 868.9375 MHz
Call Sign KNNH307, Granted 04/03/2001.
COLUMBIANVILLE (LAPEER COUNTY), MICHIGAN
866.0125, 867.0625, 867.4750, 867.6375, 867.9750, 868.1125, 868.4750, 868.8125, 868.9750 MHz
Call Sign KNNH308, Granted 06/03/1999.
NASHVILLE (BARRY COUNTY), MICHIGAN
866.0125, 866.3875, 866.8875, 867.3875, 867.8875, 868.7000 MHz
Call Sign WPNV750, Granted 02/08/2002.
DETROIT (WAYNE COUNTY), MICHIGAN
866.4625, 866.9625, 867.4625, 867.9625, 868.4625 MHz
Call Sign WPAT830, Granted 10/28/1997.
ROMEO (OAKLAND COUNTY), MICHIGAN
866.0125, 866.5125, 866.8375, 866.9875, 867.2750, 867.4875, 867.9875, 868.2000, 868.4875, 868.5125, 868.6625, 868.8625, 868.9875 MHz

Call Sign WPAT838, Granted 09/09/1998.
MUNITH (JACKSON COUNTY), MICHIGAN
866.0125, 866.5625, 866.6875, 866.9500, 867.1875, 867.4500, 867.5625, 867.7375, 868.1750, 868.4500, 868.9500 MHz
Call Sign WPPV618, Granted 01/13/1998.
NORTHVILLE (WAYNE COUNTY), MICHIGAN
866.0125, 866.5125, 866.8625, 866.9250, 867.4250, 867.8625, 867.9250, 868.4250, 868.6750, 868.9250 MHz
Call Sign WPDW475, Granted 12/29/1998.
ITHACA (GRATIOT COUNTY), MICHIGAN
866.0125, 866.3750, 866.8750, 867.3750, 867.8750, 868.3750, 868.8750 MHz
Call Sign WPIH504, Granted 07/25/2000.
HILLSDALE (HILLSDALE COUNTY), MICHIGAN
866.0125, 866.4125, 866.9125, 867.4125, 867.9125 MHz
Call Sign WPIH505, Granted 07/25/2000.
ROLLIN (LENAWEE COUNTY), MICHIGAN
866.0125, 866.6625, 867.4375, 867.9375, 868.4375, 868.9375 MHz
Call Sign WPIH506, Granted 07/18/2000.
ADRIAN (LENAWEE COUNTY), MICHIGAN
866.0125, 867.3875, 867.8875, 868.3875, 868.6375, 868.8875 MHz
Call Sign WPIH507, Granted 07/18/2000.
LANSING (EATON COUNTY), MICHIGAN
866.0125, 866.4750, 866.6500, 866.9750, 867.0625, 867.6375, 867.8500, 867.9750, 868.1125, 868.4750, 868.9750 MHz

Call Sign WPIH508, Granted 07/18/2000.

HOLLY (OAKLAND COUNTY), MICHIGAN

866.0125, 866.5125, 866.9125, 867.3625, 867.4125, 867.6875,
867.9125, 868.3625, 868.4125, 868.9125 MHz

Call Sign WPIH509, Granted 07/18/2000.

LANSING (INGHAM COUNTY), MICHIGAN

866.0125, 866.4625, 866.8375, 867.2750, 867.4625, 867.9625,
868.2000, 868.4625, 868.5125, 868.7625, 868.9625 MHz

Call Sign WPIH510, Granted 07/18/2000.

LAKEPORT (ST. CLAIR COUNTY), MICHIGAN

866.0125, 866.6625, 867.1250, 867.3750, 867.6875, 867.8750,
868.3750, 868.5750, 868.8500, 868.8750 MHz

Call Sign WPIH511, Granted 07/18/2000.

RICHMOND (MACOMB COUNTY), MICHIGAN

866.0125, 866.6875, 866.9500, 867.4500, 867.6750, 867.9500,
868.2625, 868.4500, 868.6375, 868.9500 MHz

Call Sign WPIH512, Granted 07/18/2000.

FLAT ROCK (WAYNE COUNTY), MICHIGAN

866.0125, 866.4750, 866.5125, 866.9750, 867.4750, 867.8500,
867.9750, 868.4750, 868.9750 MHz

Call Sign WPIH513, Granted 07/18/2000.

ANN ARBOR (WASHTENAW COUNTY), MICHIGAN

866.0125, 866.5125, 866.8750, 867.3750, 867.8750, 868.3750,
868.8125, 868.8750 MHz

Call Sign WPIH514, Granted 07/18/2000.

DUNDEE (MONROE COUNTY), MICHIGAN

866.0125, 867.4000, 867.9000, 868.4000, 868.9000 MHz

Call Sign WPIH515, Granted 07/10/2000.

DETROIT (WAYNE COUNTY), MICHIGAN

866.0125, 866.4875, 866.5125, 866.9375, 867.4375, 867.9375,
868.4375, 868.9375 MHz

Call Sign WPIH516, Granted 07/25/2000.

SANDUSKY (SANILAC COUNTY), MICHIGAN

866.0125, 866.9375, 867.4375, 867.9375, 868.4375, 868.9375 MHz

Call Sign WPIH517, Granted 07/25/2000.

ALBION (CALHOUN COUNTY), MICHIGAN

866.0125, 866.2750, 866.9250, 867.4250, 867.9250, 868.4250,
868.7750, 868.9250 MHz

Call Sign WPIH518, Granted 07/25/2000.

PORTLAND (IONIA COUNTY), MICHIGAN

866.0125, 866.4000, 866.9000, 867.4000, 867.9000, 868.4000,
868.9000 MHz

Call Sign WPMT866, Granted 12/21/1998.

HEMLOCK (SAGINAW COUNTY), MICHIGAN

866.0125, 866.9875, 867.4875, 867.9875, 868.4875, 868.9875 MHz

Call Sign WPMT867, Granted 12/21/1998.

BRIDGEPORT (SAGINAW COUNTY), MICHIGAN

866.0125, 866.4250, 866.9250, 867.4250, 867.9250, 868.4250,
868.8250, 868.9250 MHz

Call Sign WPMT868, Granted 12/21/1998.

CARO (TUSCOLA COUNTY), MICHIGAN

866.0125, 867.1875, 867.4625, 867.9625, 868.4625, 868.9625 MHz

Call Sign WPMT902, Granted 12/22/1998.

POTTERS CORNERS (IONIA COUNTY), MICHIGAN

866.0125, 866.0750, 867.2125, 867.4500, 867.9500, 868.4500,
868.8125 MHz

Call Sign WPMT907, Granted 12/22/1998.

STANTON (MONTCALM COUNTY), MICHIGAN

866.0125, 866.4250, 866.9250, 867.9250, 868.4250 MHz

Call Sign WPMT908, Granted 12/22/1998.

HART (OCEANA COUNTY), MICHIGAN

866.0125, 866.9750, 867.4750, 867.9750, 868.4750 MHz

Call Sign WPMT909, Granted 12/22/1998.

BUCKS CORNERS (MASON COUNTY), MICHIGAN

866.0125, 866.4250, 866.9250, 867.9250, 868.4250 MHz

Call Sign WPMT917, Granted 12/22/1998.

FREESOIL (MASON COUNTY), MICHIGAN

866.0125, 866.4375, 866.9375, 867.9375, 868.4375 MHz

Call Sign WPMT927, Granted 12/22/1998.

WOODLAND PARK (NEWAYGO COUNTY), MICHIGAN

866.0125, 866.3750, 866.8750, 867.3750, 867.8750 MHz

Call Sign WPMT944, Granted 12/22/1998.

HESPERIA (NEWAYGO COUNTY), MICHIGAN

866.0125, 866.4000, 866.9000, 867.4000, 868.4000, 868.9000 MHz

Call Sign WPMU253, Granted 12/24/1998.

CROTON (NEWAYGO COUNTY), MICHIGAN

866.0125, 866.4875, 866.9625, 867.4375, 867.9125, 868.3875 MHz

Call Sign WPMU254, Granted 12/24/1998.

BEAL (ISABELLA COUNTY), MICHIGAN

866.0125, 866.9750, 867.4750, 867.9750, 868.4750 MHz

Call Sign WPMU258, Granted 12/24/1998.

PHELPS (CLARE COUNTY), MICHIGAN

866.0125, 866.4625, 867.4625, 867.9625, 868.4625, 868.9625 MHz

Call Sign WPMU262, Granted 12/24/1998.

HARRISON (CLARE COUNTY), MICHIGAN

866.0125, 866.4375, 866.9375, 867.9375, 868.4375, 868.9375 MHz

Call Sign WPMU263, Granted 12/24/1998.

HALLS CORNER (MECOSTA COUNTY), MICHIGAN

866.0125, 866.3875, 866.8875, 867.3875, 867.8875, 868.8875 MHz

Call Sign WPMU265, Granted 12/24/1998.

LEROY (OSCEOLA COUNTY), MICHIGAN

866.0125, 866.3625, 866.8625, 867.3625, 867.8625 MHz

Call Sign WPMU266, Granted 12/24/1998.

BALDWIN (LAKE COUNTY), MICHIGAN

866.0125, 866.4750, 867.4500, 867.9500, 868.4500 MHz

Call Sign WPNQ875, Granted 05/07/1999.

BATTLE CREEK (CALHOUN COUNTY), MICHIGAN

866.0125, 866.8750, 867.3750, 867.8750, 868.3750 MHz

Call Sign WPNQ876, Granted 05/07/1999.

COLDWATER (BRANCH COUNTY), MICHIGAN

866.0125, 866.4000, 866.9000, 867.4000, 868.4000, 868.8125 MHz

Call Sign WPNT221, Granted 06/03/1999.

PAW PAW (VAN BUREN COUNTY), MICHIGAN

866.0125, 866.0625, 866.3125, 866.4375, 866.5875, 866.8000,
866.9375, 868.2375, 868.4375, 868.5375, 868.7875, 868.9375 MHz

Call Sign WPNT222, Granted 06/03/1999.

ADAMS PARK (KALAMAZOO COUNTY), MICHIGAN

866.0125, 866.1375, 866.5500, 866.9875, 867.0125, 867.4625,
867.9375, 868.3000, 868.3250, 868.4125, 868.5250, 868.7625 MHz

Call Sign WPNT223, Granted 06/03/1999.

JONES (CASS COUNTY), MICHIGAN

866.0125, 866.4625, 866.6375, 867.9625, 868.2000, 868.4625,
868.9625 MHz

Call Sign WPNT224, Granted 06/03/1999.

SUMNERVILLE (BERRIEN COUNTY), MICHIGAN

866.0125, 866.4125, 866.8125, 866.9125, 867.1250, 867.4125,
868.5875, 868.9125 MHz

Call Sign WPNT226, Granted 06/03/1999.

COLOMA (BERRIEN COUNTY), MICHIGAN

866.0125, 866.0375, 867.4875, 867.7875, 867.9875, 868.4875,
868.6375, 868.9875 MHz

Call Sign WPNT227, Granted 06/03/1999.

SAWYER (BERRIEN COUNTY), MICHIGAN

866.0125, 866.4875, 866.7500, 866.9625, 867.8250, 867.9125,
868.3875 MHz

Call Sign WPNT228, Granted 06/03/1999.

FENNIVILLE (ALLEGAN COUNTY), MICHIGAN

866.0125, 866.4875, 866.7000, 866.9625, 867.1000, 867.9125,
868.3875 MHz

Call Sign WPNT229, Granted 06/03/1999.

SOUTH HAVEN (VAN BUREN COUNTY), MICHIGAN

866.0125, 866.3500, 866.8625, 867.3625, 867.8625, 868.0625,
868.6125, 868.8625 MHz

Call Sign WPNT230, Granted 06/03/1999.

WAYLAND (ALLEGAN COUNTY), MICHIGAN

866.0125, 866.4125, 866.9125, 867.3500, 867.4125, 868.1625,
868.2750, 868.9125 MHz

Call Sign WPNT239, Granted 06/03/1999.

PLAINWELL (BARRY COUNTY), MICHIGAN

866.0125, 866.1750, 866.3625, 866.6250, 866.6625, 867.0125,
867.4375, 868.2125, 868.3625, 868.7250, 868.8875 MHz

Call Sign WPNT240, Granted 06/03/1999.

LEONIDAS (ST. JOSEPH COUNTY), MICHIGAN

866.0125, 866.0375, 866.3500, 866.7500, 866.8625, 867.3625,
867.7875, 867.8250, 868.1750, 868.6125, 868.8625 MHz

Call Sign WPNT241, Granted 06/03/1999.

CEDAR SPRINGS (KENT COUNTY), MICHIGAN

866.0125, 866.2625, 866.4375, 866.9375, 867.0125, 867.8375,
868.4375, 868.9375 MHz

Call Sign WPNT242, Granted 06/03/1999.

CANNONSBURG (KENT COUNTY), MICHIGAN

866.0125, 866.1500, 866.8625, 867.0125, 867.3625, 867.8625,
868.8625 MHz

Call Sign WPNT244, Granted 06/03/1999.

WOLF LAKE (MUSKEGON COUNTY), MICHIGAN

866.0125, 866.3500, 867.4875, 867.9875, 868.3250, 868.4875,
868.9875 MHz

Call Sign WPNT245, Granted 06/03/1999.

ALLENDALE (OTTAWA COUNTY), MICHIGAN

866.0125, 866.0500, 866.3250, 866.4625, 867.9625, 868.4625,
868.5750, 868.8250, 868.9625 MHz

Call Sign WPNT246, Granted 06/03/1999.

CAMP HARDY (MUSKEGON COUNTY), MICHIGAN

866.0125, 866.4125, 866.5875, 866.9125, 867.4125, 868.2750,
868.9125 MHz

Call Sign WPPB730, Granted 10/07/1999.

BIG RAPIDS (MECOSTA COUNTY), MICHIGAN

866.0125, 866.9500, 867.4250, 867.9000, 868.1750 MHz

Call Sign WPPB735, Granted 10/08/1999.

LEROY (LAKE COUNTY), MICHIGAN

866.0125, 866.3250, 866.8375, 867.6750, 868.1125 MHz

Call Sign WPQD340, Granted 05/31/2000.

ROYSTON (PRESQUE ISLE COUNTY), MICHIGAN

866.0125, 867.4875, 867.9875, 868.4875, 868.9875 MHz

Call Sign WPQD341, Granted 05/31/2000.

ATLANTA (MONTMORENCY COUNTY), MICHIGAN

866.0125, 866.3750, 866.8750, 867.3750, 867.8750 MHz

Call Sign WPQD342, Granted 05/31/2000.

MANTON (WEXFORD COUNTY), MICHIGAN

866.0125, 866.4250, 867.9250, 868.4250, 868.9250 MHz

Call Sign WPQD343, Granted 05/31/2000.

ST HELEN (ROSCOMMON COUNTY), MICHIGAN

866.0125, 866.2750, 866.6625, 867.6875, 868.2125 MHz

Call Sign WPQD344, Granted 05/31/2000.

HONEYVILLE (WEXFORD COUNTY), MICHIGAN

866.0125, 866.1375, 866.6875, 867.5625, 868.2000 MHz

Call Sign WPQD345, Granted 05/31/2000.

MESICK (WEXFORD COUNTY), MICHIGAN

866.0125, 866.4000, 866.9000, 867.4000, 868.9000 MHz

Call Sign WPQD346, Granted 05/31/2000.

GRAYLING (CRAWFORD COUNTY), MICHIGAN

866.0125, 866.0750, 866.7500, 867.2750, 867.8250 MHz

Call Sign WPQD347, Granted 05/31/2000.

LOVELLS (OSCODA COUNTY), MICHIGAN

866.0125, 866.4000, 866.9000, 867.4000, 868.9000 MHz

Call Sign WPQD348, Granted 05/31/2000.

BLACK RIVER (ALCONA COUNTY), MICHIGAN

866.0125, 866.9375, 867.9375, 868.4375, 868.9375 MHz

Call Sign WPQD350, Granted 05/31/2000.

CURRAN (ALPENA COUNTY), MICHIGAN

866.0125, 866.9875, 867.4750, 867.9625, 868.9500 MHz

Call Sign WPQD352, Granted 05/31/2000.

ALPENA (ALPENA COUNTY), MICHIGAN

866.0125, 866.4875, 866.9625, 867.4375, 868.3875 MHz

Call Sign WPQD355, Granted 05/31/2000.

SO BRANCH (OSCODA COUNTY), MICHIGAN

866.0125, 866.4250, 867.9250, 868.4250, 868.9250 MHz

Call Sign WPQD356, Granted 05/31/2000.

BARTON CITY (ALCONA COUNTY), MICHIGAN

866

866.0125, 866.4875, 866.9625, 867.4375, 868.3875 MHz
Call Sign WPQD467, Granted 06/01/2000.
 OSCODA (IOSCO COUNTY), MICHIGAN
 866.0125, 866.8625, 867.8625, 868.3625, 868.8625 MHz
Call Sign WPQD468, Granted 06/01/2000.
 NATIONAL CITY (IOSCO COUNTY), MICHIGAN
 866.0125, 866.9750, 867.9750, 868.4750, 868.9750 MHz
Call Sign WPQD477, Granted 06/01/2000.
 DAMON (OGEMAW COUNTY), MICHIGAN
 866.0125, 866.9125, 867.9125, 868.4125, 868.9125 MHz
Call Sign WPQD478, Granted 06/01/2000.
 EMPIRE (LEELANAU COUNTY), MICHIGAN
 866.0125, 866.3875, 866.8875, 867.3875, 868.8875 MHz
Call Sign WPQD480, Granted 06/01/2000.
 INTERLOCHEN (BENZIE COUNTY), MICHIGAN
 866.0125, 866.9500, 867.4250, 867.9000, 868.8750 MHz
Call Sign WPQD482, Granted 06/01/2000.
 SOUTH BOARDMAN (GRAND TRAVERSE COUNTY), MICHIGAN
 866.0125, 866.4750, 867.3625, 867.8875, 868.3750 MHz
Call Sign WPQD483, Granted 06/01/2000.
 TRAVERSE CITY (LEELANAU COUNTY), MICHIGAN
 866.0125, 866.3750, 866.8750, 867.3750, 867.8750 MHz
Call Sign WPQD539, Granted 06/02/2000.
 ELKTON (HURON COUNTY), MICHIGAN
 866.0125, 866.4750, 867.3625, 867.8875, 868.3750 MHz
Call Sign WPQD540, Granted 06/02/2000.
 HALFWAY CORNERS (HURON COUNTY), MICHIGAN
 866.0125, 867.4875, 867.9875, 868.4875, 868.9875 MHz
Call Sign WPQD541, Granted 06/02/2000.
 CHEBOYGAN (CHEBOYGAN COUNTY), MICHIGAN
 866.0125, 867.1875, 867.4500, 867.9500, 868.4500 MHz
Call Sign WPQD546, Granted 06/02/2000.
 WOLVERINE (CHEBOYGAN COUNTY), MICHIGAN
 866.0125, 866.8625, 867.8625, 868.3625, 868.8625 MHz
Call Sign WPQD548, Granted 06/02/2000.
 ROGERS CITY (PRESQUE ISLE COUNTY), MICHIGAN
 866.0125, 866.9125, 867.9125, 868.4125, 868.9125 MHz
Call Sign WPQD549, Granted 06/02/2000.
 CORDWOOD (CHEBOYGAN COUNTY), MICHIGAN
 866.0125, 866.9375, 867.9375, 868.4375, 868.9375 MHz
Call Sign WPQD553, Granted 06/02/2000.
 GAYLORD (OTSEGO COUNTY), MICHIGAN
 866.0125, 866.3875, 866.8875, 867.3875, 868.8875 MHz
Call Sign WPQD555, Granted 06/02/2000.
 MIO (OSCODA COUNTY), MICHIGAN
 866.0125, 866.4750, 867.3625, 867.8875, 868.3750 MHz
Call Sign WPQD557, Granted 06/02/2000.
 OCQUEOC (PRESQUE ISLE COUNTY), MICHIGAN
 866.0125, 866.9250, 867.4125, 867.7375, 868.4000 MHz
Call Sign WPQD559, Granted 06/02/2000.
 ALPENA (PRESQUE ISLE COUNTY), MICHIGAN
 866.0125, 866.9750, 867.9750, 868.4750, 868.9750 MHz
Call Sign WPQI447, Granted 07/26/2000.
 ATLANTA (MONTMORENCY COUNTY), MICHIGAN
 866.0125, 866.9500, 867.4250, 867.9000, 868.8750 MHz
Call Sign WPQI448, Granted 07/26/2000.
 LELAND (LEELANAU COUNTY), MICHIGAN
 866.0125, 866.9375, 867.9375, 868.4375, 868.9375 MHz
Call Sign WPRF402, Granted 08/28/2000.
 HOWELL (LIVINGSTON COUNTY), MICHIGAN
 866.7000, 866.8875, 867.9500, 868.2500, 868.5750, 868.8500 MHz
Call Sign WPRJ520, Granted 10/13/2000.
 MOUNT CLEMENS (MACOMB COUNTY), MICHIGAN
 866.0125, 866.4000, 866.9000, 867.4000, 867.9000, 868.4000, 868.9000 MHz
Call Sign WPUU578, Granted 05/06/2002.
 MCFARLAND (MARQUETTE COUNTY), MICHIGAN
 866.3750, 866.8750, 867.3750, 867.7375, 867.8750, 868.5750 MHz
Call Sign WPUU728, Granted 05/07/2002.
 REPUBLIC (MARQUETTE COUNTY), MICHIGAN
 866.1000, 866.2875, 866.9875, 867.4750, 867.9625, 868.8375, 868.9500 MHz
Call Sign WPUW598, Granted 05/16/2002.
 RAPID RIVER (DELTA COUNTY), MICHIGAN
 866.4375, 866.9250, 867.4125, 868.4000 MHz
Call Sign WPUW599, Granted 05/16/2002.
 FOSTER CITY (DICKINSON COUNTY), MICHIGAN
 866.3500, 866.9750, 867.5625, 867.9750, 868.4750, 868.8000, 868.9750 MHz
Call Sign WPUW600, Granted 05/16/2002.
 GOGEBIC (GOGEBIC COUNTY), MICHIGAN
 866.9750, 867.9750, 868.4750, 868.9750 MHz
Call Sign WPUW602, Granted 05/16/2002.
 BERGLAND (ONTONAGON COUNTY), MICHIGAN
 866.4250, 867.9250, 868.4250, 868.9250 MHz
Call Sign WPUW603, Granted 05/16/2002.
 BESSEMER (GOGEBIC COUNTY), MICHIGAN
 866.4375, 866.9250, 867.4125, 868.4000 MHz
Call Sign WPUW604, Granted 05/16/2002.
 WAKEFIELD (GOGEBIC COUNTY), MICHIGAN
 866.9875, 867.4750, 867.9625, 868.9500 MHz

Call Sign WPUW605, Granted 05/16/2002.
 NEGAUNEE (MARQUETTE COUNTY), MICHIGAN
 866.9500, 867.4250, 867.9000, 868.5375, 868.8750 MHz
Call Sign WPUW771, Granted 05/17/2002.
 CHAMION (MARQUETTE COUNTY), MICHIGAN
 866.0750, 866.3250, 866.4250, 867.9250, 868.4250, 868.9250 MHz
Call Sign WPUW816, Granted 05/17/2002.
 EWEN (ONTONAGON COUNTY), MICHIGAN
 866.8625, 867.8625, 868.3625, 868.8625 MHz
Call Sign WPUW960, Granted 05/20/2002.
 AMASA (IRON COUNTY), MICHIGAN
 866.4375, 866.9250, 867.4125, 868.4000 MHz
Call Sign WPUW963, Granted 05/20/2002.
 IRON RIVER (IRON COUNTY), MICHIGAN
 866.9500, 867.4250, 867.9000, 868.8750 MHz
Call Sign WPUW966, Granted 05/20/2002.
 CRYSTAL FALLS (IRON COUNTY), MICHIGAN
 866.4875, 866.9625, 867.4375, 868.3875 MHz
Call Sign WPUX214, Granted 05/20/2002.
 BESSEMER (GOGEBIC COUNTY), MICHIGAN
 866.4000, 866.9000, 867.4000, 868.9000 MHz
Call Sign WPUX217, Granted 05/20/2002.
 IRON MOUNTAIN (DICKINSON COUNTY), MICHIGAN
 866.4500, 867.4500, 867.9500, 868.4500 MHz
Call Sign WPUX218, Granted 05/20/2002.
 IRON MOUNTAIN (DICKINSON COUNTY), MICHIGAN
 866.3625, 867.4875, 867.9875, 868.4875, 868.5875, 868.9875 MHz
Call Sign WPUX220, Granted 05/20/2002.
 ESCANABA (DELTA COUNTY), MICHIGAN
 866.4000, 866.9000, 867.4000, 868.9000 MHz
Call Sign WPUX222, Granted 05/20/2002.
 GARDEN (DELTA COUNTY), MICHIGAN
 866.4500, 867.4500, 867.9500, 868.4500 MHz
Call Sign WPUX227, Granted 05/20/2002.
 NAHAMA (DELTA COUNTY), MICHIGAN
 866.8625, 867.8625, 868.3625, 868.8625 MHz
Call Sign WPUX230, Granted 05/20/2002.
 US 141 (BARAGA COUNTY), MICHIGAN
 866.4750, 867.3625, 867.8875, 868.3750 MHz
Call Sign WPUX231, Granted 05/20/2002.
 L'ANSE (BARAGA COUNTY), MICHIGAN
 866.4000, 866.9000, 867.4000, 868.9000 MHz
Call Sign WPUX249, Granted 05/20/2002.
 MARQUETTE (MARQUETTE COUNTY), MICHIGAN
 866.4625, 867.1875, 867.4625, 868.4625, 868.9625 MHz
Call Sign WPUX398, Granted 05/21/2002.
 FAITHORN (MENOMINEE COUNTY), MICHIGAN
 866.9375, 867.9375, 868.4375, 868.9375 MHz
Call Sign WPUX400, Granted 05/21/2002.
 MENOMINEE (MENOMINEE COUNTY), MICHIGAN
 866.4250, 867.9250, 868.4250, 868.9250 MHz
Call Sign WPUX403, Granted 05/21/2002.
 POWERS (MENOMINEE COUNTY), MICHIGAN
 866.9125, 867.9125, 868.4125, 868.9125 MHz
Call Sign WPUX410, Granted 05/21/2002.
 WATERSMEET (GOGEBIC COUNTY), MICHIGAN
 866.9375, 867.9375, 868.4375, 868.9375 MHz
Call Sign WPUX411, Granted 05/21/2002.
 PALMER (MARQUETTE COUNTY), MICHIGAN
 866.3875, 866.8875, 867.3875, 868.1750, 868.6000, 868.8875 MHz
Call Sign WPUX413, Granted 05/21/2002.
 ST IGNACE (MACKINAC COUNTY), MICHIGAN
 866.9750, 867.9750, 868.4750, 868.9750 MHz
Call Sign WPUX414, Granted 05/21/2002.
 IRONWOOD (GOGEBIC COUNTY), MICHIGAN
 866.3875, 866.8875, 867.3875, 868.8875 MHz
Call Sign WPUX415, Granted 05/21/2002.
 KENTON (HOUGHTON COUNTY), MICHIGAN
 866.4625, 867.4625, 868.4625, 868.9625 MHz
Call Sign WPUX417, Granted 05/21/2002.
 LINCOLN (CHIPPEWA COUNTY), MICHIGAN
 866.4625, 867.4625, 868.4625, 868.9625 MHz
Call Sign WPUY392, Granted 05/28/2002.
 ECKERMAN (CHIPPEWA COUNTY), MICHIGAN
 866.4500, 867.4500, 867.9500, 868.4500 MHz
Call Sign WPUY404, Granted 05/28/2002.
 DETOUR VILLAGE (CHIPPEWA COUNTY), MICHIGAN
 867.4000, 867.9250, 868.4250, 868.9250 MHz
Call Sign WPUY450, Granted 05/28/2002.
 OZARK (MACKINAC COUNTY), MICHIGAN
 866.8875, 867.3875, 867.8750, 868.8875 MHz
Call Sign WPUY451, Granted 05/28/2002.
 GOULD CITY (MACKINAC COUNTY), MICHIGAN
 866.4000, 866.9000, 867.4000, 868.9000 MHz
Call Sign WPUY453, Granted 05/28/2002.
 NAUBINWAY (MACKINAC COUNTY), MICHIGAN
 866.4250, 867.9250, 868.4250, 868.9250 MHz
Call Sign WPUY454, Granted 05/28/2002.
 PARADISE (CHIPPEWA COUNTY), MICHIGAN
 866.4750, 867.3625, 867.8875, 868.3750 MHz
Call Sign WPUY455, Granted 05/28/2002.

BARABA (HOUGHTON COUNTY), MICHIGAN
 866.3750, 866.8750, 867.3750, 867.8750 MHz
Call Sign WPUY456, Granted 05/28/2002.
 HESSEL (MACKINAC COUNTY), MICHIGAN
 866.9875, 867.4750, 867.9625, 868.9500 MHz
Call Sign WPUY457, Granted 05/28/2002.
 DONKEN (HOUGHTON COUNTY), MICHIGAN
 867.4875, 867.9875, 868.4875, 868.9875 MHz
Call Sign WPUY458, Granted 05/28/2002.
 GREENLAND (ONTONAGON COUNTY), MICHIGAN
 866.4500, 867.4500, 867.9500, 868.4500 MHz
Call Sign WPUY459, Granted 05/28/2002.
 BIG BAY (MARQUETTE COUNTY), MICHIGAN
 866.3625, 866.8625, 867.3625, 868.3625, 868.8625 MHz
Call Sign WPUY685, Granted 05/29/2002.
 MUNISING (ALGER COUNTY), MICHIGAN
 866.4750, 867.3625, 867.8875, 868.3750 MHz
Call Sign WPUY687, Granted 05/29/2002.
 MELSTRAND (ALGER COUNTY), MICHIGAN
 866.9875, 867.4750, 867.9625, 868.9500 MHz
Call Sign WPUY689, Granted 05/29/2002.
 SAULT STE MARIE (CHIPPEWA COUNTY), MICHIGAN
 867.4875, 867.9875, 868.4875, 868.9875 MHz
Call Sign WPUY690, Granted 05/29/2002.
 RACO (CHIPPEWA COUNTY), MICHIGAN
 866.9250, 867.4125, 867.8625, 868.4000 MHz
Call Sign WPUY691, Granted 05/29/2002.
 SENEY (SCHOOLCRAFT COUNTY), MICHIGAN
 867.4875, 867.9875, 868.4875, 868.9875 MHz
Call Sign WPUY693, Granted 05/29/2002.
 NEWBERRY (LUCE COUNTY), MICHIGAN
 866.4625, 867.4625, 868.4625, 868.9625 MHz
Call Sign WPUY694, Granted 05/29/2002.
 HEADQUARTERS LAKE (LUCE COUNTY), MICHIGAN
 866.4875, 866.9625, 867.4375, 868.3875 MHz
Call Sign WPUY698, Granted 05/29/2002.
 GRAND MARAIS (ALGER COUNTY), MICHIGAN
 866.9750, 867.9750, 868.4750, 868.9750 MHz
Call Sign WPUY699, Granted 05/29/2002.
 MARQUETTE (MARQUETTE COUNTY), MICHIGAN
 866.9125, 867.9125, 868.4125, 868.7875, 868.9125 MHz
Call Sign WPUY701, Granted 05/29/2002.
 SILVER CITY (ONTONAGON COUNTY), MICHIGAN
 866.9125, 867.9125, 868.4125, 868.9125 MHz
Call Sign WPUY702, Granted 05/29/2002.
 MANISTIQUE (SCHOOLCRAFT COUNTY), MICHIGAN
 866.9125, 867.9125, 868.4125, 868.9125 MHz
Call Sign WPUY703, Granted 05/29/2002.
 HOUGHTON (HOUGHTON COUNTY), MICHIGAN
 866.4875, 866.9625, 867.4375, 868.3875 MHz
Call Sign WPUY705, Granted 05/29/2002.
 CENTENNIAL HEIGHTS (HOUGHTON COUNTY), MICHIGAN
 866.9750, 867.9750, 868.4750, 868.9750 MHz
Call Sign WPUY707, Granted 05/29/2002.
 PHOENIX (KEWEENAW COUNTY), MICHIGAN
 866.9875, 867.4750, 867.9625, 868.9500 MHz
Call Sign WPUY708, Granted 05/29/2002.
 EAGLE HARBOR (KEWEENAW COUNTY), MICHIGAN
 866.4375, 866.9250, 867.4125, 868.4000 MHz
Call Sign WPUY709, Granted 05/29/2002.
 SUNDEL (ALGER COUNTY), MICHIGAN
 866.2875, 866.4875, 866.9625, 867.4375, 868.3875, 868.8250 MHz
Call Sign WPUY712, Granted 05/29/2002.
 SKANEE (BARAGA COUNTY), MICHIGAN
 866.9375, 867.9375, 868.4375, 868.9375 MHz

WESTLAND

Call Sign WPNW737, Granted 07/19/1999.
 WESTLAND (WAYNE COUNTY), MICHIGAN
 866.5500, 866.6125, 866.7750, 867.2500, 867.5500, 867.7500, 868.0500, 868.1375, 868.1875, 868.5625, 868.7750, 868.8000 MHz
Call Sign WPPF573, Granted 11/24/1999.
 SOUTH HAVEN (ALLEGAN COUNTY), MICHIGAN
 857.9375, 858.2375, 858.2625, 858.4375, 858.4875, 858.9375, 859.2375, 859.2625, 859.4375, 859.9375 MHz
 WAYLAND (ALLEGAN COUNTY), MICHIGAN
 857.9375, 858.2375, 858.2625, 858.4375, 858.4875, 858.9375, 859.2375, 859.2625, 859.4375, 859.9375 MHz
 ZEELAND (OTTAWA COUNTY), MICHIGAN
 857.9375, 858.2375, 858.2625, 858.4375, 858.4875, 858.9375, 859.2375, 859.2625, 859.4375, 859.9375 MHz
 ALLEGAN (ALLEGAN COUNTY), MICHIGAN
 857.9375, 858.2375, 858.2625, 858.4375, 858.4875, 858.9375, 859.2375, 859.2625, 859.4375, 859.9375 MHz

**This feature will continue in
 next month's issue of
 Montioring Times**

Broadening Your Monitoring Horizons

Here, at the start of another year, it's a good time to reflect on what you've been doing in your monitoring hobby and think about where you'd like to be. Maybe you started reading *Monitoring Times* because you're a scanner enthusiast or because you've always enjoying listening to the shortwave bands. Perhaps you're a specialist in a particular niche of monitoring such as "pirate broadcasting." Do you ever venture outside your own interests? What would it take to get you to explore the other facets of the monitoring hobby? This month I'd like to invite you to take: *The Beginner's New Year Challenge*.

◆ Here's how it works:

Most of us already have the rudiments of the other aspects of the monitoring hobby. For instance, most hams have a terrific shortwave radio built into their rigs but rarely use it for anything outside the ham bands except for WWV broadcasts. Most scanner listeners have at least a portable shortwave radio sitting on a shelf somewhere, but rarely tune in anything besides the international broadcasters. You get the idea.

Now gather up the last 12 issues of *MT* for reference material (the Larry Van Horn series "Who's Who in the Spectrum" is a great place to start). Using the material in the back issues of this magazine, challenge yourself to explore an area of monitoring you've never tried before. Here are just ten ideas to get you going:

- 1) In the evening tune your shortwave radio to 6955 (the *de facto* HF pirate transmitting frequency) and keep the audio fairly low so you'll be able to hear when one of the pirates cranks up but still go about your normal routine. Do this every evening, especially on the weekends, for one week. You should be able to hear more than a few pirates. Send for QSLs.



Erratic schedules and even more erratic programming, Pirate Radio is an HF treat. (Courtesy Outer Limits)

- 2) Round up the longest wire you can find, stretch it out in one direction and hook it up to your receiver. Now tune to the lowest frequency on your

radio and work your way up. Take your time. Make a note of all the beacon stations and match them up against lists in *Below 500 kHz*. Listen particularly for the international broadcasters from Europe and Africa. Do this each night for a week. Conditions change from evening to evening bringing in many more stations from different directions. Send your logs to Kevin Carey.

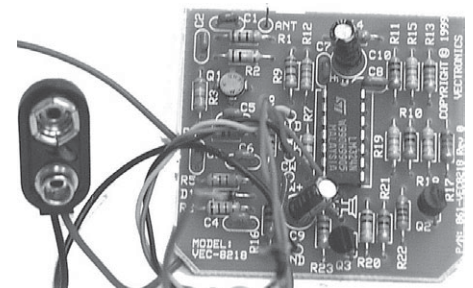
- 3) Get of one of those cheap digital modems to interface between your shortwave receiver and your computer. They're widely available for \$30-50 and allow you to tune a wide array of digital transmissions including RTTY, CW, packet, SSTV, WEFAX and more with very modest equipment. Print out your results.
- 4) Buy Radio Shack's AM band loop antenna (\$30) and, using your favorite AM radio, tune around. See how many countries you can hear. Use the FCC's database in the AM Query to confirm your catches (<http://www.fcc.gov/amquery>).
- 5) Tune in on 10 meters and 15 meters for hams accessing the amateur satellites. Find out when each satellite will be over your location (<http://www.amsat.org>) and listen for the Doppler effect transmissions in CW and SSB. But, tune fast: those satellites are really flying and won't be heard for more than 10 minutes during a pass.
- 6) Tune in between the Citizen's Band (27 MHz) and the 10 meter ham band (28 MHz) for the unlicensed "outband" operators. Imagine why there are so many of them with good signals and yet at the same time you won't hear any legitimate hams on 10 meters.
- 7) Go to a yard sale, flea market, ham fest, or an-



Antique radio: a piece of history you can actually use. (Courtesy Rachel Baughn)

tique store. Buy the oldest, cheapest radio you can find. Clean it up, turn it on, and tune around. Now get on the web and find out everything you can about your "new" heirloom. You've got a real piece of radio history and a great conversation piece. For more versatility look for old AM/FM/SW models from the '40s and early '50s.

- 8) Go through your old radio memorabilia and take out the most interesting items (QSLs, certificates, buttons, bumper stickers, etc.). Display them in a "shadow box" or picture frame.
- 9) Consider building an electronic kit. You needn't start out with anything complicated. There's a resurgence of kit manufacturers and you can get started for under \$10. You can learn the fundamentals of electronics and put some components together for your listening post. Start with Radio Shack's



Kit building is a good way to learn electronics and build your own gear. Vectronics offers this counter surveillance monitor kit. (Courtesy Vectronics)

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AM Query

Quick Links to Audio Division Information

AMQ AM Radio Database Query

Search for radio station information in the AM broadcast band (530 kHz to 1700 kHz). You may request one-line-per-record list output, or more detailed "query" output. Please refer any comments or suggestions on the AM Query to Dale Bickel, dbickel@fcc.gov.

Selection of a TEXT output option allows the user to generate a formatted output table which can be imported into other programs. Text tables do not contain all CDBS data fields, but include the values most commonly sought by users. Save the screen output as a text (.txt) file.

Search on Any Fields

You must select at least one data entry field below

State: All States

MP - Mariana Islands

MS - Mississippi

Any AM radio station in or bordering the US can be IDed at the FCC's AM-query page <http://www.fcc.gov/mb/audio/amq.html>

"blinking LEDs" for \$6 and work your way up to a stereo FM transmitter for \$30.

10) Tear something apart. Next time a piece of electronic gear craters on you don't throw it out until you've "dissected" it. Take it completely apart. See if there are any useful components inside (or outside for that matter). Tuning mechanisms, heat sinks, jacks, switches, fuses, can be stripped and donated to your "junk box." Cases, knobs, meters, even little rubber feet supports can be salvaged for future projects. The longer you stay with this hobby and the more you broaden your horizons, the more useful all this salvaged "junk" will be.



Work the AMSATs or just listen in. Find out where they are at: <http://www.amsat.org> (Courtesy AMSAT)

◆ What's Next for You?

Maybe you're a "codeless Tech" ham and you're thinking, "If I could just crack the code, I could get all those HF privileges and really widen my ham radio horizons."

Well, now is the time. Take advantage of the rest of this long, cold winter and spend a few weeks getting acquainted with Morse code. Get your speed up to 5 wpm and take that all-important step into the world of HF. There are several good CW study programs available on the web or from several companies specializing

in them.

Maybe you're a radio monitor who's always wanted to be a ham. It's easier than ever to get your "ticket" and cheaper than ever to get on the air. Simple study guides are widely available, tests are given frequently in nearly every locality. Practice exams are available on the Internet (see <http://www.qrz.com>) which allow you to test yourself before you take the real thing. You can learn where your weaknesses are and study just a little bit harder. You'll find it's worth the effort. If you find it hard to concentrate on the study guides, you can even take a video course which, while the most expensive route, really works.

If you're a ham who's not paid much attention to the monitoring hobby, just pick any of the topics in the table of contents of this magazine and you'll be off exploring a whole new world of radio listening.

◆ Then There's the Antenna

No matter what course of monitoring you choose, you'll find that your only limitation will be the size and complexity of your antenna. Now is a great time to plan your next antenna project. Be creative: don't limit yourself. Before you run out and buy an antenna, consider building it instead. There are great all-band HF wire antennas you can build for well under \$100. You can even build your own beam antennas with aluminum tubing available from your local hardware store. Your local tractor supply store has miles of aluminum wire and supports to build really long Beverage antennas or outstanding loop antennas. You can buy cheap off-the-shelf antennas which can be stacked in bays to build high gain, narrow beamwidth arrays for FM, TV, UHF Ham or scanning.

Improving your current antenna system will almost always improve your monitoring, regardless of what band or mode you're into. So, take a serious look at your listening post and imagine what you need to do to beef up the antenna. If you're in a place where you can have outdoor

antennas, you can stack quite a few smaller antennas, such as a scanner beam, VHF/UHF TV log periodic beams on the same mast and use a TV rotator to turn the lot. If you're in a place where you're not allowed outdoor antennas, you can put them all in an attic and enjoy nearly equal performance. If your attic is big enough you can even mount a rotator!

The main thing is, don't be satisfied with where you are and what you've got. At the same time, don't be deterred by lack of funds or space. Everybody's got a handicap of some kind. I've seen folks who had only a small balcony put up three satellite dishes for all the C and Ku-band satellite action. I talked to one ham who was using the rain drip flashing on his roof as an antenna. Another loaded up his extensive rain gutter system to put out a signal. Yet another was using a 3-ft diameter no-gap loop at 4-ft above ground and was putting in a nice signal from 1,500 miles away.

◆ What Are You Waiting For?

Most of us are comfortable with our routines, but sometimes we find that by altering the routine just a little we can end up with a surprising sense of satisfaction. That small amount of encouragement may be all we need to head off in another direction in our monitoring hobby. You don't have to invent any new aspect of the hobby; I've learned a lot just by wandering down the paths already neatly blazed by others. They've done all the heavy lifting and all I'm doing is sight-seeing, but it sure is fun!

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What are the frequency limits for General class operators in the 15-meter band?

21025 - 21200 kHz and 21275 - 21450 kHz

21025 - 21150 kHz and 21300 - 21450 kHz

21025 - 21150 kHz and 21275 - 21450 kHz

21025 - 21200 kHz and 21300 - 21450 kHz

Start New Test

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Ready to move up in amateur radio? Take the on-line ham exam at <http://www.qrz.com/p/testing.pl> (Courtesy QRZ.COM)

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Q. I notice more and more rigs are coming out with DSP IF filters, with the advantage of many different IF bandwidths compared to fixed analog filters like crystal, ceramic, or even mechanical. But doesn't the analog-to-digital conversion create noise which could defeat the purpose?

A. Commonly available audio DSP does produce noise, and it can interfere with marginal reception. But better design techniques and higher sampling rates can reduce the noise. Better DSP is done at the intermediate frequencies rather than at audio, and well-designed DSP allows the user to tailor the bandpass spectrum, removing unnecessary swaths and discrete frequencies, while leaving recovered intelligence, something that fixed-frequency resonant filters could never do.

Q. I recently saw an ad for a new cordless telephone operating in the 5.8 GHz band. I am familiar with the 2.4 GHz phones, but 5.8 GHz? (George Speck, Ft. Worth, TX)

A. There are several bands allocated to cordless telephones. The most popular include the original 40 MHz range, 902-928 MHz, the exploding 2.4 GHz wireless LAN band, and the emerging 5.8 GHz band.

But these higher frequencies do not necessarily mean they reach farther than the lowest frequencies; they don't. Their main advantages are less interference from co-channel users, and immunity from intercept.

Q. I recently acquired a Saab 9-3 SE automobile with a Clarion "Prestige" audio system. Oddly, the AM radio tunes in 9 kHz, not 10 kHz, increments. Saab dealers, local electronics stores, and even the radio manufacturer (Clarion) haven't a clue. What gives? (Walter Kinal, Tiverton, RI)

A. The European medium-wave broadcast band plan is in 9 kHz increments, not 10 kHz as in North America; your radio came programmed for the European market. We see this often on

shortwave portables which have the option of switching between the two.

Whether there is a selection between 9 or 10 kHz on your model, only the manufacturer knows. The Clarion owner's manual would have that information. If you have that manual (or can access one somewhere), it should tell you the procedure to make the appropriate step selection.

Depending on how the vehicle was originally ordered when new, it is possible that it came equipped only for the European market. A Saab dealer should be able to determine that for you by tracing the VIN.

Q. I've noticed that TV channel assignments in any city seem to be spaced alternately rather than consecutively, except when there is a wide separation in the spectrum band plan between consecutive channels. Even then, there appear to be no channels 6 and 7 in the same geography although there is nearly 100 MHz separation between channels. Why is this? (Ron Lindow, Pittsburgh, PA)

A. Skipping every other channel in a given geographic area reduces adjacent-channel interference that might accompany mass-produced consumer TV sets with marginal RF and IF selectivity.

The Code of Federal Regulations (CFR 47), sub-part 73 (Broadcasting) stipulates that adjacent channel TV stations must be separated by at least 100 miles; however, it also states that because of the wide frequency separation between channels 6 and 7, this geographical separation is not required. Perhaps it is just a coincidence that there are no channels 6 and 7 in the same location because of the proximity of co-channel allocations within 100 miles.

Q. I picked up an antique radio; it works fine on AM broadcast, but not on shortwave, even with a long antenna wire. What should I look for? (Todd, email)

A. There could be any combination of a number of things since circuitry is more critical at the higher frequencies, and different parts are switched in as well. Here's a starting list:

- Check all tubes
- Look for visible signs of corrosion or

heat damage on components

- Clean the band switch contacts with tuner spray
- Using a voltmeter, check all coupling and bypass capacitors, and resistors for appropriate readings. (Unless you're familiar with vacuum-tube circuitry, you need a circuit diagram for this)
- Using an ohmmeter and with the radio turned off, check all IF and RF coils for continuity

Q. Recently, while tuning between UHF channels 16 and 17 (483-494 MHz) on my TV set, I heard military aircraft communications. How was this possible? (Robert E. Brock, Tempe, AZ)

A. Now that TV receivers use synthesized oscillators, there are many possible combinations that could produce the 44 MHz intermediate frequency (IF) to be amplified and detected from a 225-400 MHz (or even 118-144 or 148-150 MHz) aircraft transmission.

But the source would have to be relatively close since these transmitters are typically in the 25 watt class, not the kilowatts of the broadcasting stations. If the aircraft were passing nearby, you might have heard it audibly, or perhaps you heard the transmission of a local "center," a remote transmitter located many miles from an air field.

It's possible as well that the aircraft frequency could mix with the signal from another service such as a UHF-TV broadcast on another channel. For example, any UHF-TV channel from 54 to 83 (715-890 MHz) could mix with a corresponding 225-400 MHz aircraft signal to provide the approximately 490 MHz required for your tuner (i.e., $807.25 - 317.25 = 490$).

The fact that TV receivers are designed to detect wide FM and aircraft use narrow AM is another puzzle, but TV sets are competitively designed for low-cost consumer applications, so many shortcuts allow various sorts of interference.

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to bobgrove@monitoringtimes.com. (Please include your name and address.) The current Ask Bob is now online at our website: <http://www.monitoringtimes.com>

Getting Started

Bright Ideas

Gary Webbenhurst

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garywebbenhurst@monitoringtimes.com

It has become customary for this column to restart the numbering system beginning with the January edition, so let's start with a clean slate and see how much we can cover!

1 Last month I pointed out the good deals on closeouts for the Radio Shack Pro 92 and Pro 93. Well, I took my own advice and bought another Pro 92. That's right, another one. Now I have two. I use these on my "frequency expeditions." I search for new frequencies at target locations like a nearby city, airport, port, military base, etc. I call this the active, as opposed to passive, part of monitoring. I especially delight in finding the PL or digital tones used by the various systems.

2 To protect my healthy dollar investment in radios, I use Pelican® hard-sided cases, which come in black or orange. I prefer the small black ones, as they are less noticeable. Website is <http://www.casesbypelican.com>, and they are also available from several vendors, including Galls at 1-800-477-7766, and Safety911 at 1-800-345-9935. At around \$25-\$60, the case is cheaper than a broken radio.

In the case carry a couple of "specialty" rubber ducks, such as for aircraft and 800 MHz. I also keep pens in the case and notepaper in the top lid under the foam. That way I never lose any of my hard-found data. When I get home, I get out my *Police Call* book and try to piece together the "real" frequencies that are in use, by what agencies, and for what purpose. Naturally, the final information is typed up, and stored in a computer file.

3 Another great buy was the sale on the RS Pro 95. With 1,000 channels and alpha-numeric tagging, this one pretty much demands programming via your computer. Luckily, Don Starr has written a shareware program called Win95, available for download at <http://www.starrsoft.com/freeware/win95>. Don has also written programs for other radios. Thanks, Don!

There is always much confusion about the necessary cable to program radios. There is one basic cable, the model 29A sold by RT Systems. Their website is <http://www.rtsars.com/>. If you previously bought a software/cable package for a radio, then you already have the right cable. This cable will work with virtually all the handheld scanners/ham receivers on the marketplace.

Well, okay, a couple of radios require a stereo to mono adapter available at RS. This is the

two-way cable, not to be confused with the cheaper one-way cable or the one that Radio Shack sells.

4 To keep all my scanners humming requires a lot of batteries. I usually use rechargeable batteries. Two of my regular suppliers are <http://www.mahaenergy.com/> and <http://www.batteriesamerica.com/hamradio.htm>. The next two sites are new ones for me. Note they each sell their own version of battery carriers. Try <http://www.nimhbattery.com/> and <http://www.greenbatteries.com>. The latter sells a handy carrier for your spare AAs. Hey, at three for \$10.95, you can share with a friend!

5 Gremlins recently stole the tuning knob for my Icom 2100 Mobile transceiver. I called the IcomAmerica parts number, and they promptly sent me a new one for free. If you lose a small screw or other small item (like the rubber gasket that protects the microphone/speaker jack) the major amateur ham radio manufacturers are pretty good about this. Not so with the scanner companies.

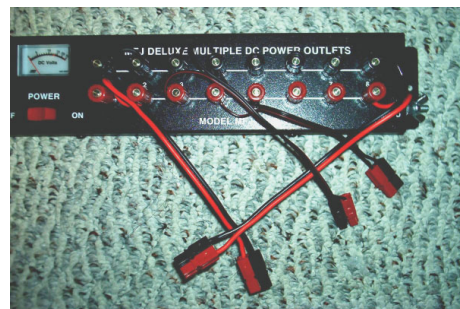
6 A friend of mine received a great Christmas gift, an Alinco DJ-X2000 (the "World" version.) Despite its high price tag, it had a problem. It would not stand upright. Even on a perfectly flat surface, the radio would wobble. I checked, and determined that the two ridges on the bottom of the radio were not square to the world. I used a metal fingernail file to carefully re-align the ridges. It solved the problem. Attaching small rubber feet would have been another option. Another happy friend. (More on the DJ-X2000 next month.)

7 I always have a scanner running with a memory bank designated for the "Watch and Listen" frequencies. After weeks of silence, I was recently rewarded when a rarely used sheriff's frequency suddenly jumped to life. It was a pursuit: hot and heavy with the siren blaring. The officer's voice noticeably tense from the adrenalin flowing. After it ended, a second pursuit. Then another. Well, by this time, I realized it was for training purposes. Still worth listening to, the channel has become busy with training radio traffic. You never know when a frequency might find a new life. (I don't usually give out frequency information, but to avoid the avalanche of mail from Spokane readers, the frequency is

154.755 simplex.)

8 Milcom enthusiasts are looking forward to the new publication of "Military Aircraft Designations and Systems." The website is <http://www.ultratech.net/~davtown/>. If you're interested in the fascinating specialty of military communications, try this website: <http://www.milaircomms.com/>.

9 Last summer, I extolled the wonders of the new RigRunner® DC power distribution strip. I already own a couple of others. I bet you do, too. Well, here is a good winter, indoor project. I retrofitted my older model by running short wires (about 10 inches) from each binding post. I then soldered on Anderson power poles. I now have several short pig-tails to quick-connect with the rest of my power cords and radios, all of which sport the new Anderson poles that are quickly becoming the standard for 13 volt DC power distribution.



10 Attention SWLs: Do you belong to NASWA? No? Well I highly recommended it. Check them out at <http://www.anarc.org/naswa/>. Their SWL Winter Fest is coming March 7-8, 2003. You can join by sending US \$26.00 to NASWA, 45 Wildflower Road, Levittown, PA 19057, U.S.A.

11 Have your new 2003 calendar handy? The 52nd Dayton Hamvention is coming May 16-18, 2003. This is the world's largest amateur radio gathering and trade show. Even if you are not a ham, you should try to make the pilgrimage at least once. I was there in 2000: A radio experience not to be missed. The website is <http://www.hamvention.org/>.

I am always happy to hear your comments, questions, suggestions or challenges. See you next month.

Refarming at the Movies

Happy New Year everyone! Let's start out with a reminder to keep the *positive* scanner stories flowing. All *MT* readers can help to provide a balanced view of the radio hobby. *MT* often features news stories about scanner owners who assist public safety officials and render aid through authorized response agencies.

Please continue to send us these stories along with your personal experiences and frequency lists. We may not have an aggressive political action group supporting us, but we can still make our voices heard through *MT* and our positive scanning activities. YahooGroups also has a mailing list dedicated to scanner news stories. Check it out at http://groups.yahoo.com/group/Scanner_News_Stories/

◆ Bank One: Lights, Camera...Scanner

It's time to revisit the motion picture industry. While most think of Los Angeles and New York as the film hubs, production services are actually offered in many large cities. Film production is a popular scholastic choice and film-related coursework is available at almost every major university. More importantly, commercials, documentaries, corporate training films, tourism and convention videos, television shows and motion pictures are taped or filmed everywhere. Each new broadcast, cable or satellite channel is another potential source of local radio traffic. This is a business that relies heavily on radios to get their jobs done.

MT readers living near theme parks and tourist attractions should be familiar with broadcast news and motion picture production frequencies. Those living near large, annual events, such as New Year's parties and Fourth of July extravaganzas, also have a regular opportunity to scan these channels. Elsewhere, local film and television production offices may give you a hint of what's in town and where the film sites will be located. A local government permit is usually required for film work, and the issuance of a permit is usually within the Public Record.

Stadiums, auditoriums, parades, festivals and fairs are good bets for some type of filming activity. So, too, are corporate headquarters buildings, historic sites, severe weather locations and high-technology facilities. Just watch the Discovery Channel for a week and you'll see an amazing range of locations, events and

subjects. Each site probably had radios in use.

To monitor the majority of filming sites, a hobbyist needs to keep track of only four main frequencies: 173.225, 173.275, 173.325, and 173.375. These channels are shared with some other services (usually related to newspapers), but they have hosted film production communications for many years. Communications are simplex, so you'll have to be near the filming location to hear the action.

Recently, the FCC has "refarmed" the frequency allocation tables and grouped the "Film and Video Production Radio Service" into the "Industrial and Business Pool" of frequencies. This change, along with the adoption of narrowband channel spacing, now provides several hundred frequencies for use by production companies. Actual channels to be used must be coordinated with FCC-designated representatives, but the four channels listed above will still be heard regularly since many, many radios are in existence with the older channel plan.

Before you program or search the hundreds of pool freqs, first check out the other channels from the original Film and Video Production Radio Service list. These are also in existence in many film company radio systems:

152.87, 152.90, 152.93, 152.96, 152.99, 153.02

The Industrial/Business Pool includes thirteen formerly-separate radio services, consisting of all the frequencies that were in any of the Industrial and Land Transportation Radio Services:

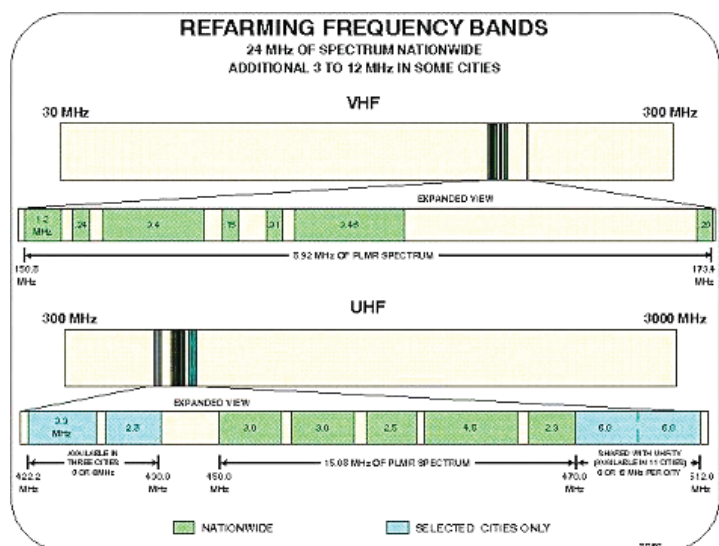
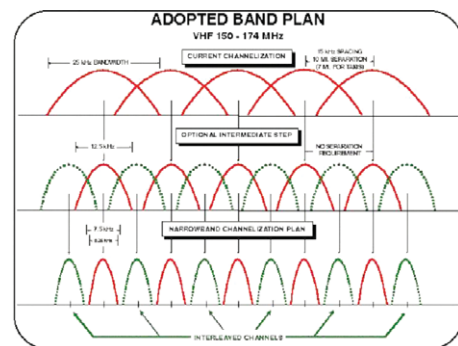
Power Radio Service; Petroleum Radio Service; Forest Products Radio Service; Film and Video; Production Radio Service; Relay Press Radio; Service; Special Industrial Radio Service; Business Radio Service; Manufacturers Radio Service; Telephone Maintenance Radio Service; Motor Carrier Radio Service; Railroad Radio Service; Taxicab Radio Service; Automobile Emergency Radio Service (source: FCC)

A complete list of frequencies available to the pool, including the narrowband allocation

tions, is available from a link at the FCC's Wireless Telecommunications Bureau website at <http://wireless.fcc.gov/plmrs/iblic.html> (click on Rule 90.35(b)(3)).

For a list of some local government film and television offices, see the links in Table 1. Some film office websites are little more than phone lists of permit officers, while others are extravagant productions themselves. The best ones include upcoming productions, schedules and locations. Some even have historical filming info and photos of all the major productions that have occurred there.

One more thing...if a locality has a film office, they also have enough productions being booked to keep the office busy! So check out the film channels, business pool channels, and your local government and public safety channels whenever you see a production crew in town.



◆ Monitoring Weather Research Activities

Regarding the two-part weather research feature in the October and November issues of *MT*, hobbyist Allan Stern conveyed his experiences monitoring such programs:

"The attraction I have to listening to the ER-2 and other weather research aircraft comms is that these comms are (1) more conversational than most military comms, which are often terse, monosyllabic jargon; (2) often louder and clearer than other comms, since they are often at higher altitude; and (3) very interesting, because the research pilots are constantly updating their position coordinates, altitude and flight regimes."

"Of course, it is even more interesting to follow the comms if the flights originate out of a base that you are familiar with, because then the landmarks mentioned in the comms are known, unlike the landmarks in a Military MOA which are non-descript river turns and terrain features. And finally, the comms heard from an ER-2 are just made more fascinating because one is aware that the pilot had to be suited up hours before his launch, and had to be conditioned on his oxygen-rich air supply well in advance, and is flying a machine that is awesome in its performance."

"I love hearing the comms of everyday fighters and mammoth transports that constitute 99% of my monitoring hobby, but the high-altitude weather research (and lower-altitude Hurricane Hunters) are definitely more captivating."

Thanks, Allan, for these comments and for your extremely detailed, authoritative posts on a variety of radio mailing lists. For those who are unaware, Allan has an encyclopedic knowledge of aircraft, bases, squadrons and deployment parameters. His informative contributions not only educate other hobbyists, but also make monitoring more enjoyable for newbies and veterans alike.

◆ Niagara Falls Scanning

David Martin of Niagara Falls, New York, sent in his partial frequency list with this note:

"Frequencies included here are not all that I have accumulated, as I have four scanners...three Radio Shack models and one crystal controlled Regency. All antennas are indoor types. My portable is a Radio Shack Pro-63."

"The Niagara Falls area is a good area for scanner enthusiasts," David continued, outlining three major commercial airports plus an Air Reserve Base nearby. "We regularly have aircraft flying over...the Falls at Niagara. 122.05 is the frequency to use in flights over the Falls; there is a small tower for regulating the flights during daylight hours, operated from the Canadian side."

David also has a request: "Radio equipment from Buffalo Fire Department's old frequency has been sold to the Niagara Falls Police Department. 153.89 mobile and 154.19 base have been de-tuned by a radio tech at the police department" and he says a new, unknown frequency is being used by detectives who now have this equipment. Anyone have the info?

Here is David's list for Niagara Falls, New York and vicinity:

Niagara Falls Police
460.375 / 465.375 fl
460.125 / 465.125 fl

Niagara Falls Fire
460.575 fl
460.525 fl

New York State Park Police
153.995
155.685

New York State Police
154.665 Troop A
155.505 Troop A
154.695 Troop A Mobile
155.625
155.535

New York State Police Thruway Authority
453.425 Ch. A
453.525 Ch. B

Other Public Safety Frequencies
46.060 Niagara County Fire Base
46.2200 Niagara County Fire Callback
139.455 Ontario Provincial Police
140.970 Ontario Provincial Police
141.510 Ontario Provincial Police
141.735 Ft. Erie, Ontario Police
142.005 St. Kitts Police
142.230 Welland, Ontario Police
142.410 St. Kitts Police
142.545 Niagara Falls, Ontario Police
153.800 Niagara Regional Fire
154.145 Orchard Park Fire
154.295 Angelica Fire
154.800 Springfield Police
154.755 Niagara County Sheriff
155.175 Rural Metro Ambulance
155.205 Buffalo General Hospital Security
155.250 Niagara County Township Police
155.340 Mercy Flight for Western New York
155.370 Erie County Fire
155.715 Buffalo Ambulance
155.835 Erie County Rural Bus Lines
156.075 Eden local government
412.0625 St. Kitts Fire
424.375 Buffalo Fire
429.375 Buffalo Fire, Mobile
453.050 University of Buffalo PD
460.075 Erie County, South
460.175 North Tonawanda Police
460.200 Erie County, Central
460.450 Erie County, North
469.425 Niagara Falls, Ontario Fire

Greater Rochester Airport
123.7
119.55

Niagara Falls Airport
118.5 tower
119.25 clearance delivery

Pearson Airport (Toronto)
125.4 approach
118.0 tower

St. Catharines Airport
135.6

Toronto Island Airport
118.2 approach
119.2 tower

Weather Research Aircraft
122.85 NOAA ops
122.90 NOAA ops
123.35 NASA ER-2
Niagara Falls Air Reserve Base
149.1500 USAF Reserve Crash-Fire Net
150.3250 USAF Security
150.3500 USAF Security
173.5875 USAF Reserve Crash-Fire Net
163.625 Border Patrol, Niagara Frontier

Marine
156.700 Welland Canal Locks
157.050 Coast Guard
157.100 Coast Guard
157.125 Coast Guard
157.150 Coast Guard
161.775 Mariners Weather Forecasting
162.475 Canadian Weather Service
165.690 Welland Canal

Railroad
160.230 Amtrak
160.365 CSX, New York and Lake Erie RR
160.815 Amtrak
161.070 Canadian National RR
161.130 CSX
161.415 Canadian National RR

Thanks, David, for sharing your frequency list. We invite all our readers to submit frequency and radio information so this column will represent all areas of the country. One reader has requested a public safety profile for the New Orleans areas as well as the Louisiana State Police. Please send your information to the Scanning Report, c/o Monitoring Times or email robertwyman@monitoringtimes.com.

Table 1:

Sampling of Local Government Film Production Office Links

Albuquerque TV & Film Commission: <http://www.abqcvb.org/film/>
Antelope Valley Film Office: <http://www.avfilm.com/>
Arizona Film Commission: <http://www.azcommerce.com/Film/default.asp>
Baltimore Film Commission: <http://www.mdprg.com/office.asp>
Boston Film Bureau: <http://www.cityofboston.com/film/default.asp>
California Film Commission: http://www.filmcafirst.com/state/cfc/cfc_homepage.jsp
Charlotte Region Film Office: <http://www.charlotteregion.com/crp/filmooffice/FilmHome.asp>
Chicago Film Office: <http://www.cityofchicago.org/filmooffice/>
City of Seattle - Mayor's Film & Video Office: <http://www.ci.seattle.wa.us/filmooffice/>
Colorado Motion Picture & Television Commission: <http://www.coloradofilm.org/intro.html>
Connecticut Film, Video & Media Office: <http://www.ctfilm.com/>
Dallas/Fort Worth Regional Film Commission: <http://www.dfwfilm.org/>
Florida Governor's Office of Film & Entertainment: <http://www.filminfloida.com/>
Georgia Film & Videotape Office: <http://www.georgia.org/film/countdown.asp>
Greater Cincinnati Film Commission: <http://www.filmcincinnati.com/>
Greater Milwaukee Film Commission: <http://film.state.wi.us/>
Idaho Film Bureau: <http://www.filmidaho.org/>
Illinois Film Office: <http://www.illinoisbiz.biz/film/index.html>
Iowa Film Office: <http://www.state.ia.us/film>
Kansas Film Commission: <http://www.filmkansan.com/>
Louisiana Film Commission: <http://www.lafilm.org/>
Metro Orlando Film & Television Commission: <http://www.filmorlando.com/>
Maine Film Office: <http://www.state.me.us/decd/film/>
Maryland Film Office: <http://www.mdfilm.state.md.us/>
Massachusetts Film Office: <http://www.state.ma.us/film/>
Miami Mayor's Office of Film & Entertainment: <http://www.filmiami.org/>
Michigan Film Office: <http://film.michigan.org/>
Minnesota Film Board: <http://www.mnfilm.org/>
Missouri Film Commission: <http://www.ecodev.state.mo.us/film/>
Nashville Mayor's Office of Film: <http://www.filmnashville.com/>
Navajo Nation Film Commission: <http://www.cia-g.com/~navflmot/>
Nebraska Film Office: <http://www.filmnebraska.org/>
New Hampshire Film & TV Office: <http://www.filmnh.org/>
New Jersey Motion Picture & Television Commission: <http://www.njfilm.org/>
New Mexico Film Office: <http://www.edd.state.nm.us/FILM/>
New York State Governor's Office for Film & TV Dev: <http://www.nylovesfilm.com/index.asp>
North Carolina Film Commission: <http://www.ncfilm.com/>
Northwest Colorado Film Commission: <http://www.steamboat-chamber.com/html/filmboard.html>
Ohio Film Commission: <http://www.ohiofilm.com/>
Oregon Film & Video Office: <http://www.oregonfilm.org/>
Pennsylvania Film Office: <http://www.filmnpa.com/filmpa/index.jsp>
Philadelphia Film Commission: <http://www.film.org/>
Pittsburgh Film Office: <http://www.pghfilm.org/>
Providence Film Commission: <http://providenceri.com/film/>
Rochester/Finger Lakes Film & Video Office: <http://www.filmrochester.org/>
San Diego Film Commission: <http://www.sdfilm.com/>
San Francisco Film & Video Arts Commission: http://www.ci.sf.ca.us/site/film_index.asp
South Carolina Film Office: <http://www.scfilmoffice.com/>
Tennessee Film, Entertainment & Music Commission: <http://www.state.tn.us/film/>
Texas Film Commission: <http://www.governor.state.tx.us/film/index.htm>
Tucson Film Office: <http://www.filmtucson.com/>
Virginia Film Commission: <http://www.film.virginia.org/>
West Virginia Film Office: <http://www.wvdo.org/filmooffice/>
Wisconsin Film Office: <http://film.state.wi.us/>
Wyoming Film Office: http://www.wyomingfilm.org/internal/_film.cfm?areaID=18&navDetailID=270

A Royal Visit

Once again, working near Toronto's Pearson airport has its advantages. It seems to be an extraordinary coincidence that international VIPs seem to arrive and depart during *ScanCan*'s lunch hour. His holiness Pope John Paul II arrived in Toronto during the lunch break in July. Then, in October, Her Majesty Queen Elizabeth II departed Pearson airport following a short visit to Toronto and once again it happened at lunchtime.

Now that viewing facilities at Pearson have become very difficult to find, your intrepid reporter from the Great White North had to resort to desperate measures to find a suitable vantage point to watch the royal departure. Not knowing whether runway 05 or 06L would be used, added to the difficulty. Fortunately, the same controller was working both runways and the tower frequencies of 118.35 and 118.7 were linked.

I started monitoring at 12:00 noon from a bank parking lot near the end of runway 05 but heard nothing to suggest that the royal departure was imminent. At 12:15 I moved on to review activity on 06L a couple of kilometers south. Luck was with me. As I approached the perimeter roads near runway 06L I heard the controller give permission for take-off to "Royal One." Taking a bit of a chance on picking up a speeding ticket, I stepped hard on the gas pedal of my Camry. I knew that planes usually roll for about 30 seconds before wheels up, so that was how long I had to get in position. I pulled into the parking lot of a prominent office building south of the runway, just in time to see a Canadian Forces Airbus leaving the runway. Within seconds the plane had disappeared into the low cloud that was hanging over the city and I turned my attention to my Icom radio.

The controller for the runways handed Royal One over to departures on 128.8 MHz. After another couple of minutes departures instructed the plane to call Toronto Centre on 124.92 MHz. Another couple of minutes later came another instruction to go to 134.57 MHz. I knew that the next handoff would be to another control center out of my receive range, so I shut down my radio and completed my log of the day's activity.

❖ Bill 49 – A Threat to Ham Radio?

A private members bill has passed second reading in the Ontario legislature.

Bill 49 seeks to make it illegal to operate cellular telephones, fax machines and computers in a moving vehicle. Emergency services and members of the public using a handsfree device will be exempted. It is unknown at this stage whether mobile amateur radio equipment will be caught in the net of this bill.

Radio Amateurs of Canada (RAC), our national organization representing hams at regulatory body hearings, has written the government expressing concern that if amateur radio equipment were to be included there would be a serious impact on amateur radio contributions to public service. ARES (Amateur Radio Emergency Service) and Canwarn (severe weather spotters) activities would be curtailed, robbing the public of a valuable addition to the official emergency services.

Bill 49 was the "topic of interest" at one local net that *ScanCan* checked into recently. Naturally hams tend to consider themselves safer drivers than cellphone users and the majority were in favor of banning cellphone use while maintaining the right to operate mobile amateur radio equipment.

Private members bills often do not make it through parliament. Government policy bills tend to absorb much of the legislators time. However, this bill has legs and would mirror other initiatives passed into law elsewhere. *Scanning Canada* will stay tuned to this issue.

❖ Scanning the Slopes at Whistler, BC

ScanCan is very keen on skiing. I tried it once and following two hours of absolute terror I

can honestly say that I am awed by the skill and fearlessness of people who strap on intentionally slippery skis and then slide down steep hills at high speed. I can watch it for hours.

So, when I had the chance to visit the mecca of Canadian downhill skiing at Whistler, BC, last summer, I jumped at the chance. The ski season had closed just a week before so there was not a chance that I would be tempted, or dared, to repeat my encounter with fear. Besides, I was far too busy (collecting frequencies for *Scanning Canada* readers) to find time to ascend the five thousand feet or so to the top of Whistler mountain and do something foolish.

Whistler is right on the BC Rail line a couple of hours out of Vancouver. The resort is vying for the chance to host the 2010 Winter Olympic Games and is considering using the rail line to transport competitors and spectators from Vancouver to the slopes. The Sea to Sky Highway is a picturesque but dangerous two lane road and is considered unsuitable for the heavy volume of traffic that it would have to carry for the Winter Olympics.

Here is *ScanCan*'s compilation of frequencies for the Whistler area:

BC Ambulance Service - Whistler
142.395 149.110 414.1875

Whistler & Blackcomb Mountain Resorts Ltd
150.575 151.025 151.145 151.625 151.985 152.060
153.305 166.785 167.610 169.605 169.710 169.980
173.670 464.6375

Resort Municipality of Whistler
150.7550 151.355 151.595 152.915 153.020
153.950 154.540 158.820 162.210 163.200 163.650
167.760

Whistler Heli-Skiing Ltd
150.575 153.530 159.525

Blackcomb Helicopters Ltd
162.870 162.870 167.010

Next month, *Scanning Canada* leaves the thrills and spills of international skiing behind as we travel further up the BC Rail line into the ice fields and the mountainous interior of British Columbia. This trip on the great iron horse is going to get even more interesting yet.

73 till next month, de John, VA3KOT.



Summer in Whistler Village, BC

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849,0125-868,9875 MHz., 894,0125-956,000, 1240,000-1300,000 MHz.

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The Bearcat 895XLT is superb for intercepting trunked analog communications transmissions with features like TurboScan™ to search VHF channels at 100 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a Signal Strength Meter, RS232C Port to allow computer-control of your scanner via optional hardware and 30 trunking channel indicator annunciators to show you real-time trunking activity for an entire trunking system. Other features include Auto Store - Automatically stores all active frequencies within the specified bank(s). Auto Recording - Lets you record channel activity from the scanner onto a tape recorder. CTCSS Tone Board (Continuous Tone Control Squelch System) allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning pleasure, order the following optional accessories: PS001 Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter \$14.95; PS002 DC power cord - enables permanent operation from your vehicle fuse box \$14.95; MB001 Mobile mounting bracket \$14.95; EX711 External speaker with mounting bracket & 10 feet of cable with plug attached \$19.95. CAT895 Computer serial cable \$29.95. The BC895XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, EDACS, ESAS or LTR systems.



Bearcat® 245XLT Trunk Tracker II

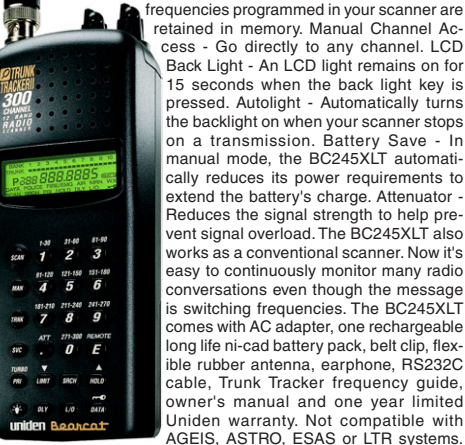
Mfg. suggested list price \$429.95/CEI price \$189.95

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10 Priority Channels • Programmed Service Search
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Bearcat 278CLT 100 ch. AM/FM/SAME WX alert scanner.....	\$139.95
Bearcat 250D 1,000 ch. TrunkTracker III handheld scanner.....	\$339.95
Bearcat 245XLT 300 ch. TrunkTracker II handheld scanner.....	\$189.95
Bearcat 248CLT 50 ch. base AM/FM/weather alert scanner.....	\$84.95
Bearcat Sportcat 200 alpha handheld sports scanner.....	\$159.95
Bearcat Sportcat 180B handheld sports scanner.....	\$139.95
Bearcat 80XLT 50 channel handheld scanner.....	\$99.95
Bearcat 60XLT 30 channel handheld scanner.....	\$74.95
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AOR AR16BQ Wide Band scanner with quick charger.....	\$199.95
Sangean ATS909 306 memory shortwave receiver.....	\$209.95
Sangean ATS818 45 memory shortwave receiver.....	\$139.95
Uniden WX500 Weather Alert with S.A.M.E. feature.....	\$39.95

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Antarctica: The Ultimate Southern Trip

Northern hemisphere winter gets a lot of people thinking about heading south. Some, though will travel as far south as anyone can get on this planet. Yes, once again it's summer at the South Pole.

While several countries claim pie-shaped wedges of Antarctica, international treaties ensure that research stations remain the primary activities, regardless of whether or not military staff them. Short wave utility radio, also known as high frequency (HF), was once the lifeline back to the inhabited world, though now most routine traffic moves via satellite.

Remaining HF capability is used by several countries and agencies to contact low-flying planes and field parties on the ground. Some 10-kilowatt bases are still in use, as maintained by technicians who make the trip south every year.

In past seasons, many aircraft on Antarctic runs have used the appropriate callsign of "ICE" plus a number. United States stations are often reached by flights from New Zealand. Another "cold" radio is NNN0ICE, the Military Affiliate Radio System station at McMurdo. Look for them just above and below the 20-meter amateur band.

This is also the season for the US Coast Guard's Operation Deep Freeze. The icebreaker/cutter *Polar Sea* is making the six-month sup-

ply run this year, carrying two Coast Guard helicopters. These are for ice scouting and final deliveries to such isolated spots as Amundsen/Scott Station, within sight of the South Pole.

In the past, Deep Freeze has used Coast Guard net frequencies of 4426/4134, 6501/6200, 8764/8240, and 13089/12242 kilohertz (kHz), all upper-sideband voice (USB). The first frequency of each duplex pair is the coastal station, while cutters transmit on the second.

The US National Science Foundation, which operates many of these research out-

posts, uses the primary Oceanic Data Facility (ODF) frequencies of 8998 and 11553 kHz USB. These also attract some other countries and agencies. In the past, Antarctic activity has also been logged on such frequencies as 4067, 4125, 4242, 7665, 8867, 11255, 11558, and 13385 kHz USB.

Australia once operated a large HF network on 5400 kHz, linking Antarctic operations to Sydney.

It's now largely dismantled, but still used in a few places for specific ground-to-air contact.

Interestingly, the Australian Bureau Of Meteorology (BOM) operates VLM, a 1000-watt radiofacsimile (FAX) transmitter at lonely Casey Station. Assigned frequency is 7470 kHz, or 7468.1 for USB reception. Polar weather charts are transmitted continuously. With its historic callsign (once used by Radio Australia), and general remoteness, VLM would be a very nice catch.



◆ Cuban Morse from Canada?

Ary Boender, in his highly recommended *Internet Numbers & Oddities Newsletter*, passed along a Canadian report of extremely loud signals for the Cuban Morse code "numbers" station. The anonymous listener suggested Ottawa as a possible transmitter location.

This is an interesting theory that your editor has been pondering for quite some time as well. The Cuban station, known as "M8" to followers of the arcane numbers hobby, has a truly astonishing signal strength, audible pretty much nightly. Look for a station sending 5-figure

groups, all with the letters ANDUWRIGMT for 1 through 0.

So it was time to do some work with **W6ELProp**, the propagation freeware from local ham Shel Shallon. I used to drive by Shel's tower daily, usually finding it cranked down for the neighbors. Sometimes, though, it would extend to its full, majestic height, telling me to hurry home and listen for whatever rarity Shel had spotted. (Such is the weirdness of the radio amateur.)

W6ELProp is descended straight from Shel's highly regarded **Miniprop** application, which ran in CP/M. CP/M was quite the hot operating system in 1980. The letters might have stood for "Control Program/Microcomputers." Unfortunately, CP/M creator Gary Kildall, an extremely interesting chap who very narrowly missed becoming the world's richest man, insisted right up to his untimely death that the letters stood for nothing. Well, they sure looked impressive at the time.

It was quite the thrill to simulate the whole ionosphere with a little 8-bit computer. It was also quite the wait. Miniprop computations could easily take 20 minutes.

Now, of course, they're done before the indicator has a chance to move. Therefore, I ran a lot of predictions from Cuba to such places as Boston and Toronto. I ran every time/frequency combination from the known M8 schedule that made any sense at all. As a control, I ran Los Angeles as well.

Results? In every case, M8 was 10 decibels (dB) stronger in Boston and Toronto than in Los Angeles, all other variables equal. Yes, this thing is 10 dB louder up there than the most window-rattling Morse code down here since the demise of the KPH flamethrower up by San Francisco. That's smoking, folks.

The typical communication transmitter would be hard pressed to make such levels, but with a path like this, a broadcast rig could do it easily. Hence we have the theory, which has gained credibility, that they might actually be feeding computer-generated audio Morse to the single-sideband exciter in one of Radio Havana Cuba's powerhouses. In such a case, even deep fades might still be so far above the receiver's quieting level as to be inaudible.

Therefore, it is impossible to say at this time that M8 really has transmitters outside Cuba. Of course, it very well might. Let's find out what you're hearing, and see you next month.

ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ALE	Automatic Link Establishment
AM	Amplitude Modulation
ARQ	Automatic Repeat Request teleprinting system
CAMSLANT	Communication Area Master Station, Atlantic
CW	Morse code telegraphy ("Continuous Wave")
DEA	Drug Enforcement Administration
E3	UK M16/SIS English "numbers" and tune
E10	Israeli phonetic English female "numbers"
E10a	Israeli "numbers," callup only
EAM	Emergency Action Message
FAX	Radiofacsimile
FACSFAC	Fleet Area Control & Surveillance Facility
FEC	Forward Error Correction teleprinting system
HFDL	High-Frequency Data Link (air digital system)
HF-GCS	High-Frequency Global Communications System
LDOC	Long Distance Operational Control
LSB	Lower Sideband
M8	Cuban CW, "cut numbers" ANDUWRIGMT
M8a	Three-message case of above
MARS	Military Affiliate Radio System
Meteo	Meteorological
MFA	Ministry of Foreign Affairs
MX	Russian single-letter CW marker, alone
MXC	Russian single-letter CW marker, clustered
NATO	North Atlantic Treaty Organization
Navtex	Navigational Telex
PACTOR	Packet Teleprinting Over Radio
PR	Puerto Rico
RSA	Republic of South Africa
RTTY	Radio Teletype
SITOR-A	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B	Simplex Teleprinting Over Radio, FEC mode
UK	United Kingdom
Unid	Unidentified
US	United States
V2	Cuban Spanish female "numbers"
V2a	Three-message case of above
VOLMET	Aviation weather broadcast

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations (encrypted, usually unidentified, broadcasts thought to be intelligence-related) are identified in () with their ENIGMA station designators, as issued by the European Numbers Intelligence Gathering and Monitoring Association.

- 518.0 ZSC/ZSJ-Capetown Radio, SITOR-B Navtex at 1226. (Bob Hall-RSA)
- 1728.0 LGN-Bergen Radio, Norway, navigation warnings in Norwegian, at 2035. (Patrice Privat-France)
- 1852.0 IPP-Palermo Radio, Italy, navigation warnings in Italian, at 2040. (Privat-France)
- 1869.0 Yarmouth Coast Guard-Canadian CG, Nova Scotia, identifying at 2040. (Privat-France)
- 1925.0 IPL-Livorno Radio, Italy, navigation warnings in Italian, at 2051. (Privat-France)
- 2608.4 FUO-French Navy, Toulon, RTTY channel bulletin at 2055. (Privat-France)
- 3167.4 "Q-0-Z"-US military net control in large US/NATO Joint Task Force Exercise 03 (JTFEX 03-1), calling "Z-4-M," at 0024. Exercise also used 4372.0. (Allan Stern-FL)
- 3364.3 FDC-Metz Air, France, CW markers at 2117. (Privat-France)
- 3485.0 VCT-Tors Cove/Rainbow Radio, Newfoundland, Canada, with military-sounding secure voice at 0550. (Herbert Newberry-GA) [According to their web site, Rainbow LDOC takes encrypted voice and data on this frequency. -Hugh]
- 3810.0 HD210A-Naval Oceanographic Institute, Guayaquil, Ecuador, with standard time beeps and Spanish announcement, sounds best in LSB, at 0559. (Newberry-GA) [75-meter amateur is shared. -Hugh]
- 3855.0 DDH3-Hamburg Meteo, Germany, FAX ice chart at 2110. (Day Watson-UK)

- 4107.0 Unid-British fishermen telling sea stories, at 0110. (Barry Williams-AL)
- 4144.0 Unid-Shrimp fisherman chattering with wife, at 0505. (Williams-AL)
- 4271.0 CFH-Canadian Forces, Halifax, NS, FAX prognostic chart at 0618. (Watson-UK)
- 4295.0 FUE-French Navy Brest, working unknown vessel in RTTY, at 0718. (Watson-UK)
- 4317.9 NMG-US Coast Guard, New Orleans, weather FAX at 0605. (Watson-UK)
- 4359.0 KPA2-Israeli intelligence "numbers" callup (E10a) in AM, at 0219. (Williams-AL)
- 4372.0 "O-0-B"-US military, link coordination with "1-P-P," at 0505. (Ron Perron-MD)
- 4479.0 Unid-Spanish female "numbers" voice, probably the Cuban "Atencion" (V2), at 0502. (Williams-AL)
- 4553.0 AF1B-Possible Lithuanian military, working KO7V in ALE at 2032. (Watson-UK)
- 4557.9 "S"-Russian Navy single-letter CW marker, Arkhangelsk, alone (MX), also on 5153.9 and 16331.9 (in clusters), at 2152. (Ary Boender-Netherlands)
- 5418.0 Unid-Cuban "Atencion" Spanish female "numbers" voice, three-message format (V2a), at 0202. (Camillo Castillo-Panama)
- 5680.0 Rescue 51-UK Search & Rescue, working Kinloss on a medical evacuation, at 0640. (Privat-France) [International rescue frequency. -Hugh]
- 5696.0 Shark 08-Self-identified as US Coast Guard Cutter *Tahoma*, working CG Rescue 6001, evacuating an injured crew member, at 0031. (Rick Baker-OH) Coast Guard Rescue 6013-USCG helicopter over a disabled vessel in the Bahamas, working CAMSLANT along with CG Rescue 1711, at 0145. (Stern-FL) NMN-US Coast Guard CAMSLANT Chesapeake, VA, working Coast Guard 11713, at 0606. (Newberry-GA)
- 5759.0 Cuban CW "Cut Numbers" station, 3-message format (M8a), at 0202. (Castillo-Panama)
- 5801.4 FUE-French Navy, Brest, RTTY marker with a double-wide shift like a harmonic, but not one, at 1301. (Watson-UK) [Oops. -Hugh]
- 6370.9 GYU-UK Royal Navy, Gibraltar, with RTTY channel bulletin at 2150. (Watson-UK)
- 6372.0 GYU-UK Royal Navy, Gibraltar, with RTTY channel bulletin at 2226. (Watson-UK)
- 6507.0 VTP13-Indian Navy, Visagapatnam, with RTTY weather for the Bay of Bengal, at 2055. (Watson-UK)
- 6512.0 "6-N-M"-US military, with a 22-character EAM at 2055. (Ron Perron-MD) "6-N-M," with several EAMs at 2250. (Haverlah-TX)
- 6637.0 Houston Radio-Universal Aviation, TX, LDOC working Army 164, at 0600. (Newberry-GA)
- 6676.0 VLS-Sydney VOLMET, Australian aviation weather at 0633. (Newberry-GA)
- 6679.0 ZKAK-Auckland VOLMET, Pacific aviation weather at 0621. (Newberry-GA)
- 6697.0 Door Stop-US military, with EAM at 0210. (Haverlah-TX)
- 6712.0 Unknown-US military, with 28-character EAM, at 0403. (Haverlah-TX)
- 6768.0 Cuban "Cut Number" station, letter-substituted CW numbers (M8a), at 1202. (Castillo-Panama)
- 6795.0 Cuban "Cut Number" station, CW numbers (M8a), at 1202. (Castillo-Panama)
- 6824.0 Unid-Cuban "Cut Number" station, CW numbers (M8a), at 1301. (Castillo-Panama)
- 6854.0 Cuban "Atencion" station, AM female numbers voice (V2), two Mondays at 0306. (Castillo-Panama)
- 6866.0 Cuban "Cut Number" station, CW numbers (M8a), at 1202 and 1302. (Castillo-Panama)
- 6912.0 CIO2-Israeli intelligence, callup only (E10a), in AM at 0208. Also unknown US MARS, discussing net training exercise schedules at 0214. (Williams-AL)
- 6930.0 VLB2-Israeli intelligence, callup only (E10a), in AM at 0512. (Williams-AL)
- 6959.0 Lincolnshire Poacher-British intelligence (E3), female English numbers and Poacher tune, at 2230. (Mark Morgan-OH)
- 6981.0 Cuban "Cut Number" station, CW numbers (M8a), two Mondays at 1201. (Castillo-Panama)
- 7038.8 "P"-Russian Navy CW marker, Kaliningrad, alone (MX), at 1214. (Boender-Netherlands)
- 7889.0 Cuban "Atencion" station, AM numbers voice (V2a), two Sundays at 0213. (Castillo-Panama)

- 8298.1 VTP14-Indian Navy, Visagapatnam, RTTY marker at 2213. (Watson-UK)
- 8494.6 "D"-Russian Navy single-letter CW marker, Odessa, lowest of a cluster (MXC), at 1214. Also heard on 10871.6, 13527.6, 16331.6, and 20047.6. (Boender-Netherlands)
- 8494.8 "P"-Russian Navy CW marker, Kaliningrad, middle of cluster (MXC), at 1214. Also on 10871.8, 13527.8, 16331.8, and 20047.8. (Boender-Netherlands)
- 8495.0 "C"-Russian CW marker, Moscow, highest of cluster (MXC), at 1214. Also on 10872, 13528, 16332, and 20048. (Boender-Netherlands)
- 8500.0 VTH5-Indian Navy, Mumbai, with offline-encrypted RTTY traffic at 1943. (Watson-UK)
- 8942.0 QR0006-Qarair Airways flight with HF DL downlink to Shannon, at 1255. (Privat-France)
- 8983.0 Coast Guard Rescue 2120-US Coast Guard aircraft, working CAMSLANT in a search-and-rescue operation at 0038. CG Rescue 2129, working CAMSLANT in search of a disabled sailing vessel, at 2007. (Stern-FL) US Coast Guard Cutter *Active*, in search of the lost F-18s off California, working CG Rescue 1704, at 0400 (Baker-OH)
- 8992.0 Identical-US military, sending Bedsread to Zulu-150 (5800 kHz) at 2005. (Haverlah-TX)
- 9007.0 Trenton Military-Canadian Forces, working Canforce 87, a C-130, at 1517. (Perron-MD)
- 9016.0 Discover-US military, with EAM simulcast on 8992 and 11224, at 1423. (Haverlah-TX)
- 9031.0 Architect-UK Royal Air Force, with airfield "color" reports at 0231. (Perron-MD)
- 9057.0 Discover-US military, with EAMs, simulcast on 8992 and 11244, at 1808 and 1823. (Haverlah-TX)
- 10242.0 Service Center-US Customs Service, working Coast Guard 34C, went to frequency "Foxtrot" (7657), at 2146. (Perron-MD)
- 10555.0 VMW-Australian Bureau Of Meteorology Weather West, with FAX, also on 11030 [VMC -Hugh], at 2128. (Newberry-GA)
- 10648.0 Dignitary-US military, attempting a patch via Puerto Rico, came from 8992, at 0557. (Haverlah-TX)
- 10780.0 Water Bug 774-US Navy P-3, in radio check with Cape Radio at 1552. (Perron-MD)
- 11034.7 Unid-Egyptian embassy, possibly Germany, working MFA Cairo in Arabic SITOR-A, at 1758. (Watson-UK)
- 11090.0 KVM70-US Department of Defense, Honolulu, HI, with Pacific weather FAX at 0655. (Newberry-GA)
- 11125.0 HZN-Jeddah Meteo, Saudi Arabia, RTTY weather at 1645. (Hall-RSA)
- 11175.0 "S-5-H"-US military, passing an exercise message to "3-S-Z" in a patch via Andrews AFB, at 0054. Andrews 02, calling Lajes HF-GCS, then Andrews 05 patching Lajes to Andrews 00, at 0233. (Haverlah-TX) [HF-GCS is the upgraded replacement for the GHFS. -Hugh] Count 24-US Air Force tanker, in a patch to Fairchild AFB via Lajes, then went to 14896, at 0355. (Perron-MD)
- 11181.0 Reputable-US military, working Offutt AFB, NE, given working frequencies of Zulu-150 (5800) and Zulu-105 (3116), at 1751. (Haverlah-TX)
- 11232.0 Halifax Military-Canadian Forces, working Canforce 4242 at 2020. (Perron-MD)
- 11244.0 Identical-US military, EAM simulcast on 8992, then calling Skymaster (a command post exercise?), at 1925. (Haverlah-TX)
- 11291.0 Dakar-Dakar Radio, Senegal, in air traffic control with various flights, at 0340. (Williams-AL)
- 11427.5 TNS-Algerian embassy, Tunis, calling Algiers in ALE at 0757. (Watson-UK)
- 11570.0 TNS-Algerian embassy, Tunis, calling Algiers in ALE at 1148. (Watson-UK)
- 12161.7 Unid-Algerian customs, PACTOR-I traffic in French at 1248. (Watson-UK) Unid-Algerian Customs, with long PACTOR-I e-mail at 1450. (Privat-France)
- 12365.0 VIB-Brisbane Radio, Queensland, Australia, wind and sea forecast for Tasmania at 0709. (Newberry-GA)
- 12369.5 TAH-Istanbul Radio, Turkey, CW identifier in SITOR-A sync marker, at 0714. (Newberry-GA)
- 12532.5 TCYN-Turkish motor vessel *Yilmaz Ayanoglu*, SITOR-A traffic to Ayanoglu Shipping via TAH, Istanbul Radio, at 0843. (Privat-France)
- 12579.0 NRV-US Coast Guard remote transmitter, Guam, with RTTY test loop and then weather, at 1504. (Hall-RSA)
- 12603.5 SVO-Olympia Radio, Greece, with CW identifier in SITOR-A sync marker, at 2230. (Newberry-GA)
- 12763.5 DAO12-Kiel Mail, CW identifiers in PACTOR markers, at 1517. (Watson-UK)
- 12788.0 NMG-US Coast Guard, New Orleans, LA, relaying "Perfect Paul" voice synthesized weather, including tropical storm Kyle, at 2303. (Newberry-GA)
- 12857.0 6WW-French Navy Dakar, Senegal, working an unheard ship in RTTY at 1647. (Watson-UK)
- 12903.0 VTH-Indian Navy, Mumbai, two coded RTTY messages in 4-figure groups, then weather for the Goa area, at 1713. (Watson-UK)
- 12932.2 RETJ-Spanish Navy, Madrid, with encrypted RTTY messages and chatter in Spanish, at 0600 and 1745. (Hall-RSA)
- 13110.0 WLO-Mobile Radio, AL, with synthesized voice advisory on Kyle, at 2308. (Newberry-GA)
- 13155.0 Bookcase-US military, with 2 EAMs at 2237. (Haverlah-TX)
- 13200.0 Offutt-US Air Force HF-GCS, Offutt AFB, NE, with a 34-character EAM at 2103. (Haverlah-TX)
- 13242.0 Identical-US military, with EAM simulcast on 8992 and 11224, at 1627. (Haverlah-TX)
- 13270.0 New York-New York VOLMET, aviation weather at 0415. (Williams-AL)
- 13282.0 Honolulu-Honolulu VOLMET, aviation weather at 0403, then Tokyo at 0410. (Williams-AL)
- 13437.0 CTV-Portuguese Navy Chief of Staff, Lisbon, calling RPFI in RTTY at 1538. (Watson-UK)
- 13510.0 CFH-Canadian Forces, Halifax, NS, with FAX weather chart at 1914. CFH, switching to RTTY with "Waiting for traffic," giving frequencies as 4271, 6496.4, 10536, and 13510 kHz, then into usual weather at 1923. (Watson-UK)
- 13927.0 AFA11YV-US Air Force MARS phone patch net, connecting Reach 4619 to McGuire AFB, for arrival arrangements and weather at 2059. (Newberry-GA) Thunderbird 14-US Air Force transport assigned to Thunderbird flight team support, in a patch to Dyess AFB to report an engine problem, at 2300. (Stern-FL) [Also check 20992.5 for this kind of MARS activity. -Hugh]
- 15016.0 Andrews-US Air Force HF-GCS, with EAM at 1732. (Haverlah-TX)
- 16305.7 RFTPA-French Forces, N'djamena, Chad, with encrypted ARQ message to RFGW, Paris MFA, at 1738. (Hall-RSA)
- 16412.7 Unid-Bank transactions in French from Kinshasa, Republic of the Congo, in PACTOR-I, at 1510. (Hall-RSA)
- 16922.4 VTH9-Indian Navy, Mumbai, with RTTY weather at 1005. (Watson-UK)
- 16985.7 CTP-NATO, Lisbon, Portugal, with RTTY markers at 1726. (Hall-RSA)
- 17215.7 LPR-Argentine Navy, Belgrano, with RTTY coastal bulletins at 0700. (Hall-RSA)
- 18220.0 JMH5-Tokyo Meteo, FAX weather chart at 1840. (Watson-UK)
- 18223.6 Unid-Egyptian MFA, Cairo, working KKVU, Accra, Ghana, in SITOR-A at 0758. (Watson-UK)
- 18316.7 Unid-Egyptian embassy, Islamabad, Pakistan, with SITOR-A traffic and chatter at 1249. (Watson-UK)
- 18320.0 STA22-Tunisian Ministry of Information, calling STA152 in ALE, at 0833. (Watson-UK)
- 18520.0 BRA-Slovakian MFA, Bratislava, working ALG, Algiers, in ALE and 10-channel digital, at 1353. (Watson-UK)
- 18571.5 AET-Tunisian diplomatic, calling OLP in SITOR-B, at 0854. (Watson-UK)
- 19036.5 Unid-Algerian embassy, Bamako, Mali, with French RTTY messages to Algiers, at 1650. (Hall-RSA)
- 20236.7 Unid-Egyptian MFA, Cairo, encrypted traffic for Pretoria, RSA, at 0903. (Watson-UK)
- 20946.9 SAM-Swedish MFA, Stockholm, message in Swedish ARQ, a mode thought long gone, at 1623. (Hall-RSA)
- 22353.5 V3AH3-Vessel *Rodina*, working UIW, Kaliningrad Radio, Russia, in third-shift Cyrillic RTTY, at 1343. (Watson-UK)
- 22354.5 J8B2154-Vessel *King Ficer*, third-shift RTTY with UIW at 1447. (Watson-UK)
- 22373.0 RKTS-Vessel *Marcal Sudec*, third-shift RTTY at 1350. (Watson-UK)
- 22603.5 UIW-Kaliningrad Radio, working vessel *Fortis Kolesnikova*, in RTTY at 1518. (Hall-RSA)
- 23375.0 RCV-Russian Navy, Sevastopol, CW weather at 1515. (Privat-France)
- 23523.0 JMJ6-Tokyo Meteo, with FAX charts at 1230. (Hall-RSA)
- 27870.0 ADW-Andrews AFB, MD, sounding in ALE at 1640. (Hall-RSA) [Answers the question whether this frequency is still active. -Hugh]

Digital Comms at Sea

This month has a decidedly nautical flavor as we take a look at an oil and gas operation that can be heard from Romania, profile Spanish Naval operations and look at the common Russian Navy BEE or 36-50 system.

◆ Petrom

WUN listener Bert van Rij first spotted the traffic from this operation earlier this year. Petrom operates oil exploration and production facilities in Romanian offshore waters of the Black and Caspian Seas. It also owns several drilling rigs which operate both at home and overseas in countries such as Iran.

The standard 100bd, 170Hz shifted SITOP-A traffic is heard in late afternoon and throughout the night (European time) on the frequency of 8401 kHz. The fact that no daytime traffic is heard on this frequency would indicate that a higher frequency is probably in use, too, but this remains hidden. The majority of messages are sent from Petrom's various rigs and oil platforms to the shore base which is addressed as "Baza Petromar."

Although the messages are in Romanian, the language's Latin roots make it fairly easy to translate from a radio monitoring perspective. Messages are mostly made up of daily reports, chemicals in stock, goods required and weather and sea-state reports such as the following example from the platform PFPC to the base:

MQIUTXPMQIUTXPMQIUTXPMQIU (selcal lead-in)
FM:PF.CP. NR.151 07.02.2002 06.30LT
TO:BAZA PETROMAR

OBSERVATII METEO:

=====

VINT:SSW 7-8M/S
VAL DE VINT:SUD CU H=1M
TEMPERATURA=6 GRC.
VIZIBILITATE=15KM
PRESIUNE= 1016,2 STATIONARA
MAREA= GRADUL 3

SEF SECTIE METEOROLOG
ING.CIRSTEA DUMITRU UDREA DAN
NNNN

No traffic has yet been heard going from the base to the offshore stations, although this is most likely to go on during Romanian office hours on the as-yet-undiscovered higher frequency. There seems to be little traffic between the rigs and platforms themselves. The selcal (selective call) used to address the shore base appears to be MQIUTXP with other rigs chosen from the series YQFx. The rigs that can be heard on this network include the following:

- De La Sectia6
- Platforma Jupiter
- Platforma Centrala
- Platforma Atlas

- P.F.P.C.
- Saturn
- Prometeu/ PFS-4

The messages are directed to various shore-based departments of Petrom as follows:

- Biroul Investii
- Biroul Produce
- Biroul Resurse
- Serviciul Investii
- Serv. Mecano energetic
- Serviciul Mecanizare
- Laborator Fluide d-nei
- Naval

Like so many of these oil and gas exploration and production networks, a little time and effort spent listening and researching can provide a lot of investigative fun with very simple equipment. The website "Rig Zone" (see Resources) can help enormously with locating the various oil and gas rigs and support ships that make up these networks. Check out *Utility Monitoring Central's* Oil & Gas section (see Resources) for details of more of these interesting utility stations.

◆ Spanish Navy

The better listening conditions in winter often have us bumping into the Spanish Navy's transmissions which, like many other military organizations, now have a mix of older RTTY equipment and newer PSK modems.

The Spanish use a distinctive set of fixed tactical callsigns using a format ranging from 61ABC to 69XYZ which are usually sent in full when using RTTY but abbreviated to just the last two letters when using voice. Most often heard is 67YTR (or "TR" on voice) but others heard include 63ETR, 63EWR, 63GBH, 63NHF, 64ERD, 66NEI, 66RES, 67ATR, 67EOK and 67GTR. Try the following frequencies for activity:

3257, 3518.5, 3521, 4154, 4158, 4261, 4311, 5826, 6234.6, 6730, 8302, 8310, 8317.8, 8318.3, 12449.5, 12469.6, 12935, 13058, 16598.4, 16618.5, 17290, 17292, 19040.2, 22737, 22785, and 25135 kHz

Regular exchanges between ships and shore bases and ship-to-ship traffic can be heard using 100bd, 850Hz shift RTTY, USB voice and CW, and lately also using the 2400bd MIL-188-110A HF modem. The high-speed modem links usually carry Microsoft Exchange e-mail traffic and use addresses like ARMADA13. Voice and RTTY is often used to set up high-speed links, too, as the following snippet of 100bd Baudot traffic requesting a switch to 600bd QPSK illustrates:

RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY
SGSGSGSGSGSGSGSGSGSGSGSGSGSGSGSG
67YTR DE 68NHF
INT ZBZ ZBO 3P 8R PSK 600 BDS CUADRICULA 112
INT ZBZ ZBO 3P 8R PSK 600 BDS CUADRICULA 112
NNNN

You can also hear a very distinctive and proprietary selcal or ALE system operated by the Spanish Navy from its base in Granada, which cycles through the following frequencies on a timed basis:

4023.7, 5257.7, 5293.7, 6767.2, 6897.2, 7673.7, 8090.7, 11156.7, 12087.7
12225.7, 14732.7 and 15984.7 kHz

The system has two channels separated by 1kHz sending 100bd/170Hz data in eight bursts of a few seconds each before moving on to the next higher frequency. Look out for this very unique system.

◆ Russian BEE

The Russian BEE system is very common throughout the HF spectrum providing a key broadcast function for that country's navy. The system's alternative name of "36-50" comes about from the system's two distinctive modes – a traffic mode that runs at 50bd (a rarely heard double-speed version sends at 100bd) and an idle mode that runs with 36bd. Those with decoders capable of measuring ACF (autocorrelation) of the signal will notice that traffic is always strongly on-line encrypted (ACF=0) but that there is a characteristic preamble (ACF=70) as the system switches from the 36bd idle to traffic.

BEE is most commonly heard with a tone shift of 200 or 250Hz, with 85, 125 and 500Hz also possible. BEE transmissions frequently switch to FSK CW to sign-off or send operational messages, which have used the callsigns of major Russian Naval stations such as RDL.

The system's use for regular broadcasts means that it is fairly easy to find throughout the day, virtually anywhere in the world. Here are a number of frequencies on which these broadcasts can be heard around the top of every hour.

10535, 11468, 11524, 12123, 14411, 14664, 15706, 16112, 16207, 18576, 19210, 19256, 19688, 19936, and 20268 kHz

That's it for now. 73 and take a while to enjoy the sounds of a radio BEE!

Resources

- Petrom <http://www.petrom.ro>
- Rig Zone <http://www.rigzone.com>
- UMC's Oil & Gas Section
<http://www.chace-ortiz.org/umc/oilgas.html>
- UMC's Petrom Profile
<http://www.chace-ortiz.org/umc/oil/Petrom.txt>
- UMC's Spanish Navy Profile
<http://www.chace-ortiz.org/umc/mil/navy/Spain.txt>
- Spanish Navy ALE Audio
<http://rover.vistecprivat.de/~signals/WAV/E-ALE.WAV>
- Russian BEE Audio
<http://rover.vistecprivat.de/~signals/WAV/BEE.HTML>

Use for shortwave? Some do, some don't.

ROI to be Closed: ORF plans to wind up Radio Austria International and to keep only two hours of ORF programming per day on SW; otherwise the transmitter will be leased out. Attempts were being made to convince the ORF council to reject this plan. Not really a surprise. Yeah, bring on the gospel hucksters! says Kai Ludwig, Germany, referring to a report in *Die Presse*, via A-DX.

Then Kai summarized an APA report from the website of the newspaper *Der Standard*: The ROI works committee confirmed that ROI will be closed by the end of March 2003. From then only some Ö1 programming and a few foreign language broadcasts will remain on SW. ROI editor in chief Michael Kerbler was instructed by the ORF management to develop a plan for a "phase out." The closure of ROI still needed to be confirmed by the ORF council.

Hmong to start own shortwave service, if VOA or RFA won't. Hmong Lao Radio (Radio Hmong Hope): United Lao Movement for Democracy Chairman Shoua Cha told *Clandestine Radio Watch* the station was launched in May 2002 and broadcasts "educational programs, entertainment, sports and world news to Hmong people who cannot read or write" around the world. Target audience is not primarily for listeners in Laos, but also for Hmong speakers in Thailand, Vietnam, Australia, Europe and North America.

"It is a project... to educate and get our message out to the world." Few stations broadcast in the Hmong language, which according to Cha, who has testified before U.S. Congress, is regrettable. "We have urged the U.S. government to add Hmong to VOA and R. Free Asia. We would like to have feedback and (receive) suggestions from our listeners," to P. O. Box 2426, St. Paul, MN 55106.

It is likely that the organization will not understand "reception reports" and the interest of

non-Hmong speaking listeners, so radio listeners are advised to take care in writing to the station. The ULMD also plans to unveil a website soon where the station's audio will be posted. Hmong Lao Radio programs are recorded in Minnesota and broadcast via commercial transmitters in Uzbekistan between 0100 and 0200 GMT Fridays only on 12070. So reports Nick Grace C., *Clandestine Radio Watch*.

Originally this was on 17540 kHz; now it's 12070. Heard at 0139, music, very good signal in Chile, per Hugo López C., *Cumbre DX*. It opens at 0100 after test tones; 0112 including English lessons. E-mail address found at <http://home.earthlink.net/~freelao/intro.htm> did not work, says Gabriel Iván Barrera, Argentina, in *Conexión Digital*.

B-02 HFCC file is available now: <http://www.hfcc.org/data/b02/b02allx2.zip> (Uwe Volk via Wolfgang Büschel, DF5SX)

AFGHANISTAN All the info I could gather about Information Radio, 8700, has it located in Afghanistan since at least early April, probably earlier. Where it might have been before that time I don't know (Gerry Bishop, USAF, *DX Listening Digest*)

[non] B-02 schedule for Radio Afghanistan in Pashto/Dari:

0130-0227 6000 Abu Dhabi 250 kW / 045°

0230-0327 9655 Abu Dhabi 250 kW / 045°

1330-1627 18940 Norway 400 kW / 095 deg (Observer, Bulgaria)

ANTIGUA BBC agreed in the high court to pay £50,000 libel damages to a Commonwealth leader accused of misusing health funds and being involved in gun running and drug trafficking. Lester Bird, the PM of Antigua and Barbuda, accepted the settlement to halt legal action over allegations broadcast on Radio 4's *Today* program and the *World Service* last July. The corporation apologized and accepted that the assertions were unfounded. They included claims that he spent state health funds on lavish parties, holidays, and cosmetic surgery for friends (*Guardian* via Bill Westenhaber) BBC happens to have a big SW relay station on Antigua (gh)

ARMENIA Voice of Armenia, Yerevan, heard on 9960 with English 2040-2100 but announced schedule gave 11625 instead, unheard (Roger Chambers, NY, ODXA)

AUSTRALIA Queensland-based Station X, <http://www.stationx.com.au> says it has been allocated a SW frequency by the Australian Communications Authority, 2368.5 kHz with 1 kW (© Radio Netherlands Media Network) As at October 30, ACA had no record of any license being issued for 2368.5 (Bob Padula, Melbourne, *World Of Radio*) Peter Tate, founder of Station X, indeed has licenses registered with the ACA and ABA. Format will most probably be 10 to 25, with a lot of younger pop sounds (Tim Gaynor, Gold Coast City, Queensland) Don't be surprised if you hear that Station X has implemented DRM on these frequencies in, say, 2-3 years. This would give it an equivalent FM quality service with the reach of MF, HF (Nigel Holmes, Radio Australia, via John Wright, ARDXC) Australian government is vigorously endorsing migration to DRM for services in the range 2300-26100 kHz, but not on MF or VHF. This would apply to all existing licensees, including Radio Australia, the ABC's Northern Territory HF service, Vision International, HCJB-Australia, and any other future licensees (Bob Padula, *DX Listening Digest*)

AUSTRIA Wolf Harranth left *Intermedia* at the end of October, but the show will continue with Vera Bock, already responsible for the French-language *Flash des Ondes*. Producer Marianne Veith will stay with the program (Kai Ludwig, Germany, *DX Listening Digest*)

BOLIVIA R. Fides heard on 9624.75 at 0230-0257* Oct. 31 with soccer match // 6155.03 (Gabriel Iván Barrera, Argentina, *dxing.info*)

Had not been reported on 31m for years (Arnaldo Slaen, *Conexión Digital*) Also at 1152 on 9624.7 (Alfredo Benjamin Cañote Bueno, Space Master, Perú, *DX Listening Digest*)

BOUGAINVILLE R. Independent Mekamui: QSL letter from Sam Voron for 3850 kHz, 80 watts, says: "Broadcasting from the 15 km no-go zone centred on the Panguna copper mine and defended by the people's Mekamui Defense Force (MDF). The no-go zone is set up by the current traditional land-owner Francis Ona, President of the Mekamui National Congress, which is the voice of the traditional chiefs supporting the no-go zone in Central Bougainville. The SW radio station is the people's only communication to the outside world. Living in the mountains and jungles around the mine site, the people set up the no-go zone to stop efforts to regain control of the mine now that the 10 year civil war has ended and peace restored." Sam now has an e-mail address: svoron@hotmail.com (Paul Ormandy, *DX Listening Digest*)

BRAZIL R. Gazeta, São Paulo, is definitely dropping evangelical programming as of Jan 1, resuming its mission as a university station. Journalism students of the Cásper Libero faculty will be presenting their own programs (Magaly Prado, columnist, via Cassiano A. Macedo, *Radioescutas*)

At 0220 I am hearing the second harmonic of Radio Mundial on 6650. Fundamental 3325 is stronger than before (Rik van Riel, Curitiba PR, harmonics yahoo group)

BULGARIA It was mentioned in German broadcasts of R. Bulgaria that the management intends to turn the station's format to CNN-like "world news." The editorial staff already expressed on air that they are not at all happy about both this decision nor the airtime reduction (Kai Ludwig, Germany, DXLD) English too?

CHINA Some DXers have been wondering if the Chinese are using Continental transmitters to jam VOA. The answer seems to be yes. A couple of years ago a dozen new transmitters were put on the air for CNR-1. They are assumed to be the Continental 100 kW rigs listed by TDP for Beijing. These can be sorted out because they usually do not have the satellite delay of other sites with transmitters for CNR-1. Several of these transmitters are used for jamming during part of the day, notably during the period 0300-0700, when at least 15550, 17550, 17565, 17605 are used to jam RFA Chinese and CBS-RTI Chinese (Olle Alm, Sweden, *DX Listening Digest*)

COLOMBIA A big and very nice looking computer-made "Tarjeta QSL card" from La Voz de su Conciencia, Colombia, in Spanish and English and v/s is Martin Stendal. They say that they are on 6010 kHz now and: "Desde Colombia para el Mundo" and "Una Extensión de radio Alcaraván 1530 AM". (Björn Fransson, Sweden, *DX Listening Digest*)

Mission statement of La Voz de tu

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming;

+ = continuing but not monitored; 2 x freq = 2nd harmonic; B-02 = winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated

Conciencia from their QSL certificate (also in Spanish): "In such a violent country like Colombia there is also hope; there is a signal that focuses on bringing peace and a message of reconciliation to all Colombians and friends in all the world; this is the Short Wave radio station... We have the firm conviction of breaking the established patterns and bringing a different message in the area of Short Wave with life-giving programs such as: *The Truth about the Truth, Peaceforce, Order your House*, and other programs made by a dedicated work group located in Bogotá and Puerto Lleras." (DXLD)

CROATIA [non] HRT external services via DTK Germany: 0000-0159 UT 9925 kHz 230° to LAm; 0200-0359 9925 300° to USA/Mexico; 0400-0559 9925 325° to NAm; 0600-0759 9470 230° to SEaU/NZ; 0800-0959 13820 260° to Au (via Michael Bethge, WWDXC, BC-DX)

CUBA A source at the U.S. Interests Section, which operates out of the Embassy of Switzerland in Havana, has confirmed to WRMI that the radios being distributed to Cubans are Chinese-made Tecsun brand, model R9701, which come with "external antenna, earpiece, batteries and battery charger." The model R9701 has AM, FM and seven shortwave bands. A photo on the company's website <http://www.tecsun.com.cn/english/swdual.htm> shows the radio. An article in USA Today indicates that the radios cost \$10 each, and the U.S. Interests Section has distributed more than 1000 of them. The Section told WRMI that "we are not locked in on this model and may be receiving others in the future," which seems to indicate that they intend to continue giving away radios on the island (Jeff White, WRMI, *DX Listening Digest*) See also USA!

How'd you like to attend the 16th World Congress on Sexology, scheduled this March in Habana? RHC is running a contest: answer the following question: What are three sexual rights that should be respected by a society? A trip to Cuba for one week along with the participation in the congress is first prize, with souvenirs as ten consolation prizes. Deadline for entries is February 28. Send to: Radio Havana Cuba, P.O. Box - 6240, Havana, CUBA. Email: radiohc@enet.cu Fax: (53-7) 870-5810 (via Swapan Chakraborty, Kolkata, India)

RHC, 9820, heard with a program of Cuban sacred music on UT Mon from 0610 tune-in until 0625, presented by 'Armando Guerra'; then Guerra was back with a quite different musical show of the Cuban top ten. Before 0700 the R. Reloj relay had begun (Glenn Hauser, OK, *DX Listening Digest*)

DENMARK [non] According to World Music Radio <http://www.wmr.dk> the station "is planning to resume operation during 2003." WMR was last on air between May 31st and August 24th 1997 from the Meyerton shortwave site in South Africa (© Radio Netherlands Media Network)

ECUADOR HCJB was missing from 9745, Nov 4 at 0100 (Chris Campbell, swl) Back by 0148. Power interruption caused by volcanic ashfall (Marie Lamb, *ibid.*) While ashfall in Quito was light, engineer Tim Zook measured 3/8 of an inch at transmitter site in Pifo. Ash may have affected antennas, causing arcing. Hydro link from Papallacta also interrupted; had to fire up diesel backup (HCJB website)

We now are financially unable to send QSLs or other material without return postage: one IRC, or one US dollar, or one Euro, or 3 unused US 37 cent postage stamps (HCJB via Harjot Singh Brar, GRDXC)

HCJB B-02 English, all daily, in program cycle order, 100 kW except 12005 75 kW, ° azimuths:

0200-0400 12040 42 SAs
0700-0900 5965 35 Eu
0700-1100 11755 228 SPac
1100-1430 12005 43 Carib
1100-1430 15115 352 NAm, 128 SAm
2000-2200 11895 42 Eu
0000-0300 9745 351 ENAm
0300-0600 9745 324 WNA

Also 1 kW on 21455 at 35° to Eu, 225° to SPAC: 0000-0600, 0700-1100, 1100-1430.

[non] HCJB via UK in Russian & Central Asian Languages, 1700-1800 11760 500 kW, 62°; to NAF in Arabic 2100-2230 12025 250 kW, 165° (via Alokesh Gupta, BC-DX)

Ham Radio Today moved to Sat/UT Sun and expanded back to half an hour: 0300 India 12040, 0800 Eu 5965, 0830 SPac 11755, 2100 Eu 11895, 0100 ENAm 9745, 0400 WNA 9745. *DX Partyline* also rescheduled on Sat/UT Sun to: 0200 India 12040, 0700 Eu 5965, 0700 SPac 11755, 0900 SPac 11755, 2000 Eu 17660, 0000 ENAm 9745, 0300 WNA 9745 (Mick Delmage, Alberta, *DX Listening Digest*)

EGYPT Tentative B02 schedule in English from Egyptian Radio & TV Union Broadcast Engineering:

0200-0330 9475 NAm
1215-1330 17775 SAs [new? Tashkent uses this in summer]
1630-1830 15255 C&SAF
2030-2200 15375 Waf
2115-2245 9990 Eu
2300-0030 9900 ENAm
(Tarek Zeidan, Egypt, DSWCI DX Window)

GERMANY I was in Cologne last September and paid a visit to Deutsche Welle's offices and studios. I was given a comprehensive tour by Andrea Schulz and Waldemar Kramer. The studios and engineering facilities are located in the tall building along Raderberggürtel, while the administrative offices are in a low office complex just behind it. I was told that DW will be moving to Bonn in 2003; if memory serves me right, DW even printed this news in one of their program guides. My gracious hosts, however, could not tell me exactly when this will take place and from their expressions, it appears to me that they will be staying in Cologne for a little while longer. To Herr Kramer and Frau Schulz, many, many thanks for the hospitality (Paul Angelo Santos, Quezon City, Philippines, *DX Listening Digest*) Original building contains asbestos.

GREECE Voice of Greece weekly English programs: *It's All Greek To Me* heard Sun 1900-2000 on 5865 9420; and *Hellenes Around the World* 1700-1800 Saturday on 9420 15630 (Mike Barraclough, England, *World DX Club Contact*) Both also on Delano 17705, very good here (gh, OK)

HONDURAS 4832, Radio Litoral pounds in; a tough catch when they first came on, not any longer (Hans Johnson, Rio Hondo TX, *Cumbre DX*)

INDONESIA VOI English to Europe at 2000-2100 changes frequency unpredictably from one day to the next among these three: 9525, 11785, 15150 (Igor Ashikhmin, Primorskiy Kray, Russia, *Signal*) VOI in English playing lovely Indonesian music at 2030 on 9524.87 (Wolfgang df5sx Bueschel, Germany, *DX Listening Digest*)

IRAN I've found VOIRI English at 0030 on 6135, 9580; Repeat at 0130 best on 6135 (Bob Thomas, CT, *DX Listening Digest*) B-02 VOIRI/IRIB in English including time changes, now all 57 minutes: 0030 and 0130 on 6135, 9580; 1030 on 15375, 15385, 15480, 21470, 21730; 1530 on 7195, 9610, 11835; 1930 on 6110, 7320, 11695, 15140; 2130 on 9780, 11740 (Observer, Bulgaria)

[non] R. Denmark has to drop one of its frequencies via Norway at 1730 since Merlin has sold the time to a new client (Erik Kæie, DR) Norking has pushed R Norway and R Denmark away from 7490 on its winter schedule, because this frequency should be used for a Merlin broadcast towards Iran from the Kvitsoy transmitter. It's R International. There were no less than four IDs at 1813 before close down 1815*. R. International was broadcast via Grigoriopol', Moldova at *1730-1815* on 7520 during B01 period and on 9940 during A02, but obviously has been moved to Kvitsoy by Merlin. The loss of this rather low frequency of 7490 may reduce the possibilities for thousands of Norwegians and Danes living abroad throughout Europe to listen to our Home Service, as higher frequencies fade out (Anker Petersen, Denmark, *DX Listening Digest*) Plus a new morning transmission of R. International at 0230-0315 is on 7460 Moldova, 500 kW / 116° (Observer, Bulgaria)

IRELAND [non] RTE Overseas schedule via sites abroad: 0130-0200 UT 6155 kHz Cam; 1000-1030 SEAs/Au 15280; 1800-1830 ME 9895; 1830-1900 13640 C&EAm, 21630 Af (Mike Barraclough, UK, *DX Listening Digest*)

ITALY RAI B-02 English: 0055-0115 NAm 9675 11800; 0445-0500 NAF/Medit 5965 6100 7235; 1935-1955 Eu 5970 9745; 2025-2045 N&Eaf 6010 9710 11880; 2205-2230 Japan 11895 (Mike Barraclough, WDXC Contact)

JORDAN Since Oct 25 R Jordan in English at 1400-1730* on 11690 (Rumen Pankov, Bulgaria, BC-DX) Listen with LSB to avoid RTTY on high side. Passport dropped this station from the blue pages (Joe Buch, DE, *swprograms*) Jordan Weekly heard Sat 1700. Surprisingly good signal and in the clear when using ECSS-LSB. Very poor when using ECSS-USB with RTTY on high side. But no RTTY on low side (Brian Alexander, PA, *DX Listening Digest*) Then Turkey in Spanish *1730 on 11690

KAZAKHSTAN [non] Radio Dat shifted an hour later to 1600-1700 on 9925 (Mike Barraclough, WDXC Contact)

KENYA KBC's only remaining SW, the Eastern Service on 4915 (from the Langata site), has extended schedule, M-F 0300-0700 and 1300-1910. *0300 may offer a good chance. Listen for a distinctive flute-and-drum interval signal, then rather mournful national anthem. English phrase "KBC Eastern Service" is ID, even when announcement is in an African language. Sunrise in Nairobi varies by only a few minutes either side of 0330 GMT throughout the year, so signal is likely to fade out by 0430 or shortly afterwards. Unfortunately, the service doesn't operate at weekends (Chris Greenway, Kenya, BDXC-UK Communication)

KOREA NORTH VOK English: 0100UT 6195 7140 9345kHz NE China; 0100 6520 7580 11735 Cam; 0200 9325 11335 SEAs; 0300 6195 7140 9345 NE China; 1000 9335 11710 Cam; 1000 9850 11735 SEAs; 1300 7505 11335 WEu; 1300 9335 11710 NAm; 1500 7505 11335 WEu; 1500 9335 11710 NAm; 1600 9975 11735 ME, NAF; 1900 7505 11335 WEu; 2100 7505 11335 WEu. Programs last 47 to 57 minutes. Based on announcements and my own monitoring (Arnulf Piontek, Germany, BC-DX)

KURDISTAN [non] Voice of Komala broadcasts every Sunday at 1700-1800 on 7560 in Kurdish and Farsi towards the Middle East (TDP Mailing List, Belgium)

There are two different "Mesopotamian" stations, according to the IDs given, and the schedule through TDP: Dengi Mezopotamya, Voice Of Mesopotamia, Kurdish: 0500-1300 Daily 15675 Tashkent, Uzbekistan, 100 kW / 256°; 1300-1700 Daily 11530 Kishinov, Moldova, 500 kW / 116°

And: Mesopotamian Radio & Television, 1700-1800 Tue/Wed/Fri on 7560, Kurdish (ex-12115) (Silvain Domen, Belgium, *DX Listening Digest*)

KYRGYZSTAN English news at 0024 from Biskkek on 4010 was SINPO 44444! (John Fisher, NL, ODXA)

On 4049.95, an unID was heard, "Hit Shortwave - Hit Music on Short-wave," then seemed to have settled down to 4939.95 instead (Jari Korhonen, Finland, *dxing.info*) Surely a Kyrgyz frequency, no longer used by the official station. Biskkek alone has more than 15 local, private radio stations on FM with various formats (Bernd Trutenau, Lithuania, *DX Listening Digest*)

LIBERIA 5470, Radio Veritas, 2123-2137 in English, religious program promos with music, canned ID (Scott R Barbour Jr, NH)

LITHUANIA Radio Vilnius B02 English: To NAm 31° on 9875 at 2330-2400; on 7325 at 0030-0100. Eu 259° on 9710 at 0930-1000. All from Sitkunai, Lithuania, 100 kW (Bernd Trutenau, Lithuania; Richard Lemke, Alberta, *DX Listening Digest*)

MALAWI MBC is on 3385 instead of 3380. Even in South Africa reception is not too good (Markus Weidner, Namibia, A-DX via Willi Passmann)

MALTA [non] VOM B-02 English: Mon-Sat 1730-1800 9850 via Roma, Italy; Sat-Thu 2000-2100 7440 via Moscow, Russia (Roberto Scaglione, Italy, ODXA) There is a DX program on Fridays (Wolfgang Büschel, Germany)

MOROCCO Medi-Un tried 9595 instead of its longtime 9575 on several occasions, switching back and forth (Olle Alm, Sweden, *DX Listening Digest*) Beam is 110 degrees towards C&S Algeria, Tunisia, Libya, Egypt and Sudan (Wolfgang Bueschel, BC-DX)

NAMIBIA There is no frequency switch from 6060 to 3270 at 1600 UT. So 6060 is 24h,

Shortwave Broadcasting

3270 is inactive. The switch from 6175 to 3290 works, but there is a strong hum on 3290. Both are 70 kW and the very last tubes are used to keep them on the air (Markus Weidner, Namibia, A-DX via Willi Passmann)

NEPAL R. Nepal have been long known as bad QSLers. Two years ago I actually visited them and asked on behalf of a German friend who had sent them a dozen reception reports over the years. And they said, "Oh yes, we have those reports!" and showed me a big stack of unopened mail from all over the world, some of it years old, and "What about it?" I tried to explain to them the idea of reports and QSLs, which just earned me blank stares and shrugs...

On top of that R. Nepal are desperately poor. The idea of folks listening to far-away radio stations and then sending them a report about it, expecting some sort of verification is just a bit too alien to folks in a country where the station engineer goes taxidiving in the evenings to feed his family. With the present crisis, I think we can all just bury our hopes for a QSL from Radio Nepal. If it weren't a propaganda instrument which the king makes good use of, Radio Nepal would have long ago ceased to be. Tape them if you can and let that be your QSL (Thomas, DL1CQ, Roth, Kathmandu, swl)

PAKISTAN R. Pakistan B-02 in English: 0045-0115 S/SEAs in Assami [but has been partly in English] 11655, 15455. 1600-1615 Turkey, Gulf, ME, NWAf English 11570, 15105; E/SEaf 15530, 17725. 0800-1104 Europe Urdu/English 17835, 21465; 1700-1900 Urdu/English 9290, 11895 (via Noel Green, DXLD) Note interesting new frequency 9290 for 1700-1900 to Europe, allegedly including English, something new. Only English in the 0800-1104 is a few minutes of news at start and end (gh)

PERÚ New Radio San Isidro, Celendin, Dept. of Cajamarca, replaced Radio Cosmos on 4627 kHz, heard 0100-0300* with local music, constant IDs (Carlos Maldonado, Santiago, Chile via Mark Mohrmann, World Of Radio)

5486.7, R. Reyna de la Selva at 1124. Reyna is the last name of owner Mr. Reyna [and a play on words, for "Queen of the Jungle"].

10039.8, R. Horizonte at 1244, 5020 x 2. On 3234.8, R. Luz y Sonido at 0254 relaying Z-Rock & Pop, 95.5 FM in Lima. On 3172.6, R. Municipal at 1110, low modulation, relaying RPP Lima 89.7 FM/730 MW.

10354.3, R. Willkamayu at 1125 and 3 days later, on 10354.1 at 1108 (Alfredo Benjamin Cañote Bueno, Space Master, Chacacayo, Perú, DX Listening Digest) A.R. Willkamayu, OBX-7L, Wanchaq, Cusco on 940 kHz with 1 kW found in a Peruvian station listing, so could 10354 be the 11th harmonic of a slightly off AM carrier around 941.27? (Mark Mohrmann, VT, DX Listening Digest) Typical format like many other Peruvians: huaynos early, morning newscast, non-folk music, news, folk music, messages, etc. Address: Radio Willkamayu, Avenida Infancia 527, Cusco; Phone +51 (84) 24-6391. I talked to the manager, Mr. Julio C. Tello on the phone. He said 10 MHz are tests with 20 watts, signing on at 1000, and I heard it again at 1020. No E-mail, but I suggested he get that (Alfredo Cañote, Perú, Conexión Digital) Willkamayu is a Quechua name referring to a sacred river of the Incas, better known by its Spanish name Vilcanota-Urubamba. Station is in the old center of Cusco, same neighborhood as R. La Hora (dxing.info)

R. Ondas del Pacifico: something strange here: I rarely hear 6782.6 at the same time as 13565.2, its second harmonic; mostly 6782.6 is a carrier without audio, while 13465.2 booms in. Heard one morning at 1100 for the first time; usually audible after 2100 (Rafael Rodriguez, Colombia, Conexión Digital)

POLAND B-02 R. Polonia English on SW reduced to: 1300-1359 9525 6095; 1800-1859 7285 5995. E-mail: english.section@radio.com.pl (Website via Alan Roe, DXLD) Note the early expiration date, Dec 31; perhaps then they will start some external relays? (gh)

SPAIN Weekly Sephardic show from REE to NAM, UT Tue 0415-0445 is back on 9690, whilst HCJB in Spanish occupies former frequency 9650 (Glenn Hauser, OK, DX Listening Digest)

SRI LANKA After a few weeks on 7440, SLBC All Asia Service moved back into the 41 m broadcast band, heard on new 7115 (Alok Dasgupta, India, BC-DX and Jose Jacob, India, DXLD) And then heard on 7049 inside the exclusive hamband! \ 11905. Sked: 0050-0400, 0800-1530 Indian languages (Jose Jacob, VU2JOS, ATOJ, India, dx india via DXLD)

SWITZERLAND SRI English, what's left of it for B-02; J = Jülich, Germany; S = Sottens, Switzerland; M = Montsinéry, French Guiana with azimuths [Jülich also prepared to back up Sottens frequencies]:

Near East & Africa:

0730-0800 J 9885 160, J 13790 200, S 17665 165

0830-0900 S 21770 165

1730-1800 J 9755 115, J 13790 115, S 15555 140

1930-2030 S 9755 200, J 13660 165, J 15485 145, M 17660 115

South America:

2330-2400 S 9885 230, M 11660 175

(via Harry Brooks, Erik Kaie, Andy Sennitt)

SYRIA [non] The Arabic Radio, originally at 1500-1530 from two different sites on unsynchronized 12085 and 12115, were one hour apart during October when one location was off DST, shifted to 1600-1630, but the other not. From late October they were both at 1600 and 20 seconds apart (via Mike Barraclough, England, World DX Club Contact)

TOGO After years of absence, 5047 heard from Nov 8 in French, African music, very weak (Pat Vignoud, France, dxing.info) 2200 carrier OK, but audio very weak, no ID (Jari Savolainen, Kuusankoski, Finland, ibid.) Presumably this is reactivated R. Lomé, Togo (Alan Pennington, Scotland, BDXC-UK) Hard to ID, but anthem at 2300 is Togo's (Mike Barraclough, Letchworth, UK, Nov 9, DX Listening Digest) Last log was in February 2001, published in Radio-Kurier (Willi Passmann, DXLD)

TUNISIA RTI: to WEu 0400-0700 7275, 1400-1700 11730, 1700-2300 7225; ME 0200-0500 9720 & 12005, 1200-1700 15450 & 17735, 1700-2100 9720 & 12005; NWAf 0400-0700 7190, 1400-1900 11950, 1900-2300 7190 (Jormo Patala, DXing.info)

UKRAINE RUI issued one "minimum" schedule until Dec. 31, with only one frequency at a time for each English broadcast, and none for North America; and a "maximum" schedule from Jan. 1 when it was hoped increase funding would allow resumption of full service, including the megawatt transmitter. Details of the latter:

English hours at 2200 on 5905, 6020, 7240, 9560; at 0100 on 5905, 9610, 9810; at 0400 on 6020, 7285, 9810; 1200 on 11825, 11840, 13590, 17760 kHz. All 100 kW except 1000 kW on 9810 to NAM (Alexander Yegorov, RUI via Wolfgang Bueschel) Until then, best reception was at 2200 on 5905 with no QRM (Kraig, KG4LAC, Krist, VA, DX Listening Digest)

USA Pres. Bush's nomination for a new member, term expiring Aug. 13, 2005, of the Broadcasting Board of Governors, overseeing US external broadcasting, is Blanquita "BQ" Cullum, host of a right-wing talk show on the Radio America network. She was previously White House liaison in the administration of Bush I (US Newswire via Kim Elliott)

VOA began a new weekly program Oct 28, *Ventana a Cuba* (Window to Cuba), hosted by the respected journalist Angelica Mora-Beals (who is well beloved in Cuba), every UT Monday at 0100-0130 on 9480, 9590, 9885, 11700 and 11990. The U.S. Interests Section in Havana recently began to promote the program. *Ventana a Cuba* – based on VOA's *Cita Con Cuba* (1962-1974) – will address numerous important issues facing Cuba today, e.g., the sugar industry crisis. VOA sources claim the program is not meant to "antagonize" Radio Marti but rather to "complement" current programming towards Cuba. Office of Cuba (OCB) Broadcasting Director Salvador Lew did not voice any opposition when this initiative was in the planning stage, according to IBB sources. Congress may reconsider the viability of spending millions of dollars on Radio Marti when it can cost-effectively fund VOA's new program that may have an even greater impact in Cuba. Is the creation of *Ventana a Cuba* a signal from the Bush Administration indicating a total loss of confidence in Radio Marti's management and ability to carry out its mission to the Cuban people? (Radio Marti Observer <http://www.cubapolidata.com/rmo/>)

The Cuban government has been able to set up an intelligence operation inside Radio Marti, according to well informed sources that did not want to be identified. The operation is being carried out by sympathizers of the Havana government who operate within the Cuban-American community in Miami, using a group of employees from the American radio station who in the last few months have made public their unhappiness with the Director of the Office of Cuba Broadcasting, (OCB), the exiled 74 year-old Cuban lawyer and radio commentator, Salvador Lew.... <http://www.lanuevacuba.com/nuevacuba/notice-02-10-1811.htm> (INSIDE RADIO MARTI, by Pedro L. González and Maria R. Morales, Radio Marti Observer, La Nueva Cuba, Octubre 18, 2002, via Oscar)

From Nov 3 on VOA's Main Street, I am doing a brief (4-5 minute) segment about developments in broadcasting and media, every UT Sunday at 0233, 0433, 0633, 1033. Best bets for North American listening: 0433 to Af on 4960, 6080, 7290, 7415, 9575, 9775; 0633 to Af on 6035, 6080, 6105, 7295, 11835, 11995, 13710; 1033 to Carib on 5745, 7370, 9590 and to EAs via Delano on 5985 (Kim Elliott, DX Listening Digest) Real and mp3 files of the show are at <http://www.voanews.com/MainStreet/index.cfm> (Richard Cuff, swprograms)

VOA's English to Africa launched a new weekly 30-minute call-in on health issues, *Housecall*, Tuesdays at 1900 (VOA press release)

Altho Mark 'from Michigan' Koerneke, who used to broadcast on WWCR, is serving a 3 to 7.5 year prison sentence for assault with a dangerous weapon and is not eligible for release until March 2004, federal agents seized radio equipment and weapons on his property near Dexter, Michigan, Nov. 6. FCC had ordered the raid due to unlicensed broadcasts on 90.7 FM. Koerneke's wife and two sons live at the property in Dexter. It is not clear who owns the weapons or who was running the radio station (from reports in the Ann Arbor News, and Detroit Now, via John W. Smith, Mike Terry)

WLW relay is being heard here in Radway, Alberta, on 26450 narrow FM almost daily. Glad my Kenwood TS440S has that mode. Many scanners now go down to 25 MHz (Bruce Atchison, DX Listening Digest)

WGY, 810, Schenectady, NY heard on 3rd harmonic 2430 at 1002 local news and ads. Very weak. WSGB Sutton, WV, on 2980, 2 x 1490, at 0959-1104, rock music from the '80s and '90s, ABC network news, ID "The Buzz, WSGB Sutton" Weak with fair peaks (Mark Mohrmann, Coventry VT, DX Listening Digest) WHKT, Portsmouth VA on 4950, 3 x 1650 with R. Disney, intermittent at 2032, but enough to block VOA São Tomé (Mark J. Fine, VA, DX Listening Digest) Also heard this between 1130 and 1230, stronger just after sunrise (George Maroti, NY, Cumbredx)

[non] R. Africa International [Methodist from New York] via DTK Jülich, Germany: 0400-0559 9815, 160°; 0600-0800 11690 190° [not to be confused with R. Okapi, Congo DR!]; 1700-1859 13820 145° and 11735 160° (via Michael Bethge, WWDXC)

Chuck Roswell, the TWR frequency manager, is retiring on December 31st and returning to the US from Austria; monitors' reports have to be dumbed down so that office workers can understand them (David O. French, London, World DX Club Contact)

VIETNAM [non] On 11560, V. of Khmer Krom R., *1359 opening music, Cambodian ID (Kouji Hashimoto, Japan Premium) Heard on Tuesdays only

YEMEN Main transmitter at Sana'a usually noted on 9779.63 kHz. But some days supposedly uses another unit and antenna centered at 9780.4. The latter is heard much better in Asia/Japan than in Europe (Wolfgang Bueschel, BC-DX)

YUGOSLAVIA [non] R. Yugoslavia B-02 English half hours: 0100 (exc. Sun) C&ENAm/WEu 7115; 0200 WNAm/WEu 7130; 1330 (M-F) Au 11835; 1930 WEu 6100; 2200 Eu 6100 (RY website via Dan Sampson, Prime Time Shortwave)

Until the Next, Best of DX and 73 de Glenn!

0002 UTC on 6954.95

PIRATE (USA): WHYP. Rock music with Tony Straka to identification by "JB". Pirates logged on subsequent sessions; **WMPR** 6955.1, 0018-0021+ & 2347-2351*; **KIPM** 6952.5, 0054-0110+; **Radio Pigmeat** 6925.4, 0128-0138*; **WMTL** 6925, 0130-0205+; **Voice of the Angry Bastard** 6950, *0003-0030 & 0131-0144+; **Voice of the Abnormal** 6950USB, 0319-0325+; **Radio Gong** 6955, 2301-2308+; **Radio Time Machine** 6055USB, 2317-2330+; **Voice of the Runaway Maraishi** 6925, 2341-0029*. (Harold Frodge, Midland, MI)

0055 UTC on 9675

ITALY: RAI. News item on GM threatens to leave Fiat //11800 (Bob Fraser, Cohasset, MA; William McGuire, Cheverly, MD)

0100 UTC on 9610

IRAN: VOIRI. Report on America's interest in Islam //11970. (Fraser, MA; McGuire, MD) 11670, 1934-1945+ //11855 SIO 322. (Frodge, MI)

0208 UTC on 9475

EGYPT: Radio Cairo. North American service with commentaries to Arabic music program at 0210. Audible 12050, 1942. (Stewart MacKenzie, Huntington Beach, CA) 9990, 2144-2155. (Frodge, MI)

0225 UTC on 6185

MEXICO: Radio Educacion. Mexican ranchero music. No identification noted, but format fits. (MacKenzie, CA; Nicholas Eramo, Buenos Aires, Argentina/HCDX)

0255 UTC on 4991

SURINAME: Radio Apintie. Very weak at tune-in with minor static crashes. Music in progress and tentative IDs amid deep signal fades. (Robert Montgomery, PA/Cumbre DX) 4990.95, 0844-0901 religious music to quick ID jingle. Fair signal with 4985 QRM. (Dave Valko, PA/CDX)

0350 UTC on 7265

GERMANY: Sudwestrundfunk. German. US pop music to birthday wishes to several American celebrities. Items of interest on Baden Baden to news on Amsterdam and New York City. Good signal quality. (Joe Wood, Gary, TN; Eramo, ARG/HCDX)

0953 UTC on 3289.9

ECUADOR: Radio Centro. Beautiful folk music and mentions of "musica popular Ecuatoriana". Time ticks at 1000. Strong signal once VO Guyana (3290) faded out. (Valko, PA/CDX)

1104 on 3345

PAPUA NEW GUINEA: Radio Northern. (New Guinea) Morning news and music segments. (Dan Ziolkowski, WI/CDX) PNG's, **Radio Morobe** (New Guinea) 3220, 1140; **Radio Southern Highlands** (Papua) 3275, 1145; **Radio Western Highlands** (New Guinea) 3375, 1158; **NBC** (Papua) 4890, 1232. (Karl Racenis, Manchester, MI/CDX)

1131 UTC on 3315

PAPUA NEW GUINEA: Radio Manus (Admiralty Islands). Male in local language, poor but audible at 1213 recheck. **Radio New Ireland** (New Ireland) 3905, 1137 with poor signal for pops and local talk. **Radio Madang** (New Guinea) 3260, 1141. (Jerry Lineback, KS/NASWA Flash Sheet) welcome to our new contributors from NASWA! - ed.

1154 UTC on 9334.8

NORTH KOREA: Voice of Korea Intl. Very muted signal in French observing internal signal amid transmitter problems. SIO 3+52. Station confirmed on 13760, //15245; 1315-1320+ 9325, mainly undecipherable and tentative on ID (Frodge, MI)

1500 UTC on 21600

UAE: Radio Dubai. Announcements to pop music from artists Black -Eyed- Peas. Promotional for relay "Dubai FM". Fair-good signal quality. (Wood, TN) **UAE Radio** Canada Intl relay 12015, 2002-2018. (Frodge, MI)

1640 UTC on 17605

FRANCE: Radio France Intl. English/French. Learn French lesson // 15605. (Fraser, MA) 9790, 2143-2158+ with Afro pops. French, Spanish and English IDs at 2157. SIO 343. (Frodge, MI)

1721 UTC on 15475

GABON: Africa # 1. French. Urban rap/hip hop format plus listener's phone calls. Station ID at 1737. SIO 454. (Frodge, MI) 9580, 2140-2200. (McGuire, MD)

1730 UTC on 4783

MALI: RTV Malienne. French service with very good signal quality. Additional African briefly logged during an excellent African opening from 1730-2215 noted as; 4820 **Radio Botswana**; 4835 & 5995 **RTV Malienne**; 4845 **Radio Mauritanie**; 4915 **Radio Ghana & KBC Kenya**; 4950 **Radio Nacional Angola**; 4965 **Radio Christian Voice, Zambia**; 4976 & 5026 **Radio Uganda**; 5025 **ORTB Parakou, Benin**; 5030 **Radio Burkina**; 5050 **Radio Tanzania**; 5985 **Radio Congo**; 5990 & 6940 **Radio Ethiopia**; 6055 **Radio Rwanda**; 6210 **Radio Fana, Ethiopia**; 6265 **Radio Zambia**; 6350 **VO Tigray Revol, Ethiopia**. (Jari Savolainen, Kuusankoski, Finland/HCDX)

1840 UTC on 9779.63

YEMEN: Rep. Of Yemen Radio. Announcers mention of this being English service. Instrumental music to dance/pop tunes and Arabic instrumentals. Station identification, station address and nation anthem to 1858*. (Valko, CDX)

1909 UTC on 15435

LIBYA: Radio Jamahiriya. Arabic speech and vocal music. Signal chimes to pips and announcement. Brief anthem to English news 1920-1923 and political commentary, followed by feature on *Revolutionary Committee's Movement*. SIO 443. (Frodge, MI) 15435, 2205. (McGuire, MD)

1948 UTC on 13645

SWITZERLAND: Swiss Radio Intl. News Net to national news. Jazz music prior to German service commencement at 2030. (Frodge, MI; McGuire, MD)

2100 UTC 5975

ZIMBABWE: ZBC. African music tunes from announcer in local language announcing relay of "National FM". No sign of 6045 as in previous days. (Savolainen, FNL/HCDX)

2130 UTC on 6973.06

ISRAEL: Galei Zahal. Hebrew. Easy-listening pop music to brief mention of Israel prior to 2200. Newscast with audio buzz and tone interference. (Frodge, MI) **Kol Israel** 17535, 2150-2200 (McGuire, MD) 11605 //15615, 1907-1915. (MacKenzie, CA)

2145 UTC on 5025

UZBEKISTAN: Radio Tashkent. Surprised to run across this one with Asian female vocalizing to English talk on diplomatic relations. Brief closing announcement at 2157, carrier on until 2159. Not a bad signal. (Jerry Berg, MA/NASWA Flash Sheet)

2152 UTC on 7125

GUINEA: RTV Guinienne. French. Lite Afro vocals to 2059. Station's "Guenienne" ID with reports. SIO 222, best in LSB. Co-channel interference to 2200, then SIO 342+. (Frodge, MI)

2200 UTC on 13670

CANADA: Radio Canada Intl. *The World at Six* segment //6195, 9590. (Fraser, MA) **VO Vietnam relay** 6175, 0345 (MacKenzie, CA) **RCI** 15309, 0030 Spanish. (McGuire, MD)

2214 UTC on 7175

RUSSIA: China Radio Intl relay. Report on developing countries to commentary by male/female announcers. (Frodge, MI) **VO Russia** 7180 // 17595 via Petropovsk at 0210. (MacKenzie, CA) 9725, 0100. (McGuire, MD)

2335 UTC on 7255

NIGERIA: Voice of. News report on Iraq to ID and frequency quote. Parallel freq 15120 observing interferences from WYFR and REE Spain. (Wood, TN) **Radio Nigeria-Ibadan** 6050, 2140 with religious program to ID, "Radio Nigeria Ibadan the station with salvation", to 2146*. **Radio Nigeria-Kaduna** 6089.9 at 1959 in local languages. (Frodge, MI; Savolainen, FNL/HCDX)

2336 UTC on 11830

BRAZIL: Radio Anhanguera. Portuguese ad announcements to ID and continued talk features. (Rich D'Angelo, PA/NASWA Flash Sheet)

2340 UTC on 9875

LITHUANIA: Radio Vilnius. Report on Parliament to continue anti-drug program. (Fraser, MA)

Thanks to our contributors - Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times (or e-mail
gayle@webworkz.com) Please note: paper strips and cassette
recordings will no longer be accepted.
English broadcast unless otherwise noted.

See where the DX takes you in 2003!

With a new year and the DX prime, we begin this column with a great month of contributions representing amateur radio, medium wave and shortwave.

Due to financial cutbacks, HCJB has appealed to their listeners to enclose either one IRC, one US dollar or three unused USA postage stamps for a QSL or other station material. English reports should be sent to: English Language Service, P.O. Box 17-17-691, Quito, Ecuador. To learn more about this stalwart broadcaster, visit their website at; <http://www.hcjb.org/english>. Refer to *MT*'s monthly *Shortwave Guide* for current frequencies.

Radio Canada International now publishes by email, free of charge, a daily "cyberjournal" containing a summary of the main Canadian news, completed by an overview of international news. To subscribe, consult, <http://www.rcinet.ca>.

Why not begin 2003 with a few tips to improve your reply

rate? If enclosing an IRC with a self-addressed-envelope, fold your SAE over the IRC with the address innermost. Address labels are a great incentive to enclose, and certainly lessens the work load at the receiving station.

Do not use attractive commemorative stamps on the envelope, as they draw attention and can be removed and used in exchange for goods in some countries, with your QSL lost!

Do not keep sending currency or IRCs if you do not receive a reply. As one DXer explained, "why should anyone reply if he keeps receiving your money!" Try enclosing mint postage stamps next time.

Make your correspondence look like a professional letter and use security envelopes, even domestically. Consider a printed return address. This method will draw less attention to possible theft.

Finally, listen carefully to the station. Many broadcasters address their QSL policies on the air and may save you time and expense. See where *your* DX takes you in 2003.

AMATEUR RADIO

Crete-SV9CV (EU-015). 15 & 20 meters SSB. Full data color QSL card via Manager DL6FBL. Received in 252 days for two US dollars and an SAE. (Larry Van Horn N5FPW, NC)

Kalingrad-R3SRR/2 15 & 30 meters SSB. Full data card for Kalingrad Soyuz Radioljubitelej Rossii SRRQ Club Station. Received in almost two years via ARRL bureau DXCC # 154. (Van Horn, NC)

Swaziland-3DA0WPX. 10 meters SSB. Two full data color QSL cards via ZS6WPX, (Andre Van Wyk, P.O. Box 2845, Middleburg, 1050, Rep. of South Africa. Received in 362 days for mint stamps, one US dollar and Euro nested self-addressed envelope. (Van Horn, NC)

AUSTRALIA

Radio Australia, 9580 kHz via Shepparton. Full data color kangaroo card signed by Jan Johnson, plus brochures and schedule. Received in 254 days for an English report and two IRCs. QSL was routed through the Radio Australia DX Club. Station address: GPO Box 428G, Melbourne VIC 3001, Australia. (Glenn Bowman, Saline, MI)

CANADA

Radio Canada Intl, 6175 kHz. Full data QSL unsigned, plus program schedule. Received in 28 days for an English report. Station address: P.O. Box 6000, Montreal, Canada H3C 3AB. (William K. Smith, Cumberland, MD)

MEDIUM WAVE

CKDM, 730 kHz AM. Partial data letter signed by Cory Lafontaine-Promotions & Productions Manager. Two stickers and business card enclosed. Received in 45 days for an AM report. Station address: 27 3rd Avenue NE, Dauphin, MB Canada

R7N 0Y5 (Patrick Griffith, Westminster, CO)

CKJH, 750 kHz AM. Full data verification letter signed by Bayne Opseth-VE5BKO-Chief Engineer. Received in 27 days for an AM report. Station address: Box 750, Melfort, SK Canada S0E 1A0 .Saskatchewan QSL # 36, Canada QSL # 279, total MW QSL # 2, 822. (Patrick Martin, Seaside, OR)

CHWO, 740 kHz AM. Full data QSL card signed by Brian Smith-QSL Manager, plus program schedule and station history sheet. Received in 21 days for an AM report and three mint stamps (used for reply). Station address: c/o ODXA, P.O. Box 161, Willowdale Stn. A., Toronto ON Canada M2N 5S8 (William R. Wilkins, Springfield, MO)

KCLE, 1140 kHz AM. Partial data letter signed by Gary L. Moss-President, M&M Broadcasters. Two Solid Gold 1140 stickers enclosed. Received in eight days for an AM report. Station address: 919 N. Main, P.O. Box 1629, Cleburne, TX 76033-1629. (Griffith, CO)

New Zealand, Radio Rhema, Timaru-594 kHz AM. Full data QSL card signed by Dudley Scantlebury-Director of Administration, plus letter and book on Radio Rhema. Received in 50 days for an AM report. New Zealand QSL # 108. Station address: 55 Upper Queen Street, Private Bag 92-636, Symonds Street, Auckland, NZ. (Martin, OR)

WHO, 1040 kHz AM. I requested confirmation specifying operations on the standby antenna during repairs. Station returned my letter with a nice partial data QSL card unsigned in eight days. Station address: 1801 Grand Avenue, Des Moines, IA 50309-3362. (Griffith, CO)

WTAW, 1620 kHz AM. Full data antenna card signed by Ben Downs-Chief Operator, plus window decal. Received in 11 days for an AM report, one US dollar and an address label (used for reply). Station address: Box 3248, Bryan, TX 77805-3248. (Wilkins, MO)

ROMANIA

Radio Romania Intl, 15105 kHz. Full data scenery card, plus personal letter signed by Ioana Masariu-Head of English Service. Received in 81 days for an English report. Station address: 60-62 G-RAL Berthelot Street, Bucharest, Romania. (Stephen Zolviski, Columbus, OH)

USA

WBCQ-The Planet, 7415 kHz. Full data "Planet" card unsigned. Received in ten days for an English report. Station address: 97 High Street, Kennebunk, ME 04043. (Daniel Canonica, Muggio, Switzerland; Smith, MD)

WTJC, 9370 kHz. Full data QSL card signed by A. Robinson, plus sticker and program guide. Station address: 520 Roberts Road, Newport, NC 28570. (Caponica, SU)

WWCR, 5070 kHz. Full data card unsigned. Received in 18 days for an English report. Station address: 1300 WWCR Avenue, Nashville, TN 37218. (Smith, MD; Ted Gurley, USA/HCDX)

ZAMBIA

Radio Zambia, 6265 kHz. Full data plain white card signed by Patrick Nkula-for Director of Engineering. (email: Pnkula@yahoo.com) Received in 63 days for an English report, two IRCs and a souvenir postcard. Station address: P.O. Box 50015, Lusaka 10101, Zambia. (Wilkins, MO)

It Helps to Have a 'Big Brother'

First things first: Happy New Year. May yours be blessed, healthy and prosperous! Now, on to business.

It's no secret that for the last ten years or so, traditional international broadcasting has been under significant strain. Sometimes the pressure has been severe enough that services have closed down entirely, the most recent example being **YLE Radio Finland**'s foreign language components. As I write this, there is also another round of rumors surrounding **Radio Österreich International**.

◆ A Preservation Strategy

Whatever the reasons (ideological or financial), many international broadcasters have been put into their own version of "Survivor," except that the stakes – for both the program makers and their listeners – are far more serious than those found in that stupid game contrived for the vain and the voyeuristic.

However, one preservation strategy seems to have met with at least temporary success. Several international radio services have sought and formed a bond with their domestic counterparts that appear to have stabilized and even, in some cases, strengthened both of them.

The importance of this development should not be underestimated. Historically, the international and domestic services of any given broadcaster have been stubbornly independent of one another. The fact that several are now working together so consistently and effectively is a testament to either the kind of motivation created by financial necessity or the creative foresight of their respective managements ... or perhaps both.

◆ Not Unprecedented

That is not to say that it's unprecedented. Take, for example, the **BBC**. We all know about the **World Service**; but it wasn't until the advent of the Internet that most of us got a chance to actually hear some of the other **BBC** networks: **Radio 1** (rock music), **Radio 2** (popular music and light entertainment), **Radio 3** (classical music and the arts), **Radio 4** (spoken word programming) and **Radio 5 Live** (news and sports). There's also a slew of **BBC** local radio stations. Although now heard everywhere over the Internet, these are intended for domestic consumption within the UK. However, some of their programs and presenters also end up on the **World Service**: programs like *Brain of Britain* and people like **John Peel**, **Alistair Cooke** and **Charlie Gillett**. This has been true of the

BBC for decades; but on a limited and selective basis.

Radio New Zealand International (RNZI), though, has been doing this the longest. Thinking back to my earliest years in the hobby (the 1960s), I can recall **RNZI** using relays of its main domestic radio network as a staple of its daily broadcast schedule back then. Still today, "National Radio" is the identification you frequently hear when listening to **RNZI**.



◆ More By Necessity Than Choice

When **RNZI** seemed to be headed toward extinction in the early 1990s, it managed to stay on the air almost literally on a shoestring by cutting its own productions to a bare minimum, reducing its on-air hours and turning even more to its domestic side. **RNZI** has recovered some since then, but the difference between earlier examples of cooperation and those that came into being more recently are profound. The arrangements today came about much more by necessity than by choice.

Perhaps the most prominent example is **Radio Canada International (RCI)**, which as a direct result of its near total demise in the 1980s turned to the domestic **CBC Radio** for, at that time, nearly all of its content. *The World at Six*, *As It Happens*, *The House*, *The Vinyl Cafe*, *Quirks and Quarks*, *Madly Off in All Directions*, *The Inside Track*, *Global Village* are all still heard on **RCI** and new programs like *Dispatches*, *The Current*, *Sounds Like Canada*, *Workology*, *Outfront*, *C'est la Vie* have been added since. All originate from the domestic **CBC Radio One**. Today, **RCI** does again produce some of its own programming, but such offerings are still quite limited when compared to the volume of domestic **CBC** content that remains on the schedule.

◆ An Evolved Relationship

Radio Australia had a fiercely independent tradition vis-a-vis its parent corporation's (**Australian Broadcasting Corporation**) **ABC** domestic radio networks. Even when its budget and transmission resources were repeatedly ripped away over more than a decade in the '80s and '90s, **Radio Australia** found a way to soldier on and maintain that independence. Six years ago, though, a last and particularly brutal blow finally threatened this international service with extinction.

In this case, the concept of public service broadcasting itself was under siege by the Australian government, so the **ABC** was feeling the heat at the same time as **Radio Australia**. This factor may have been the agent of forming a more symbiotic relationship between the international and domestic radio services. As a result, **Radio Australia** broadcasts programming produced by several **ABC** domestic radio networks, notably and predominately the excellent "ideas" network **Radio National**, with a sprinkling of **ABC Classic FM** (*Margaret Throsby*), **Triple J** (*Australian Music Show*) and **ABC Local Radio** (*Australia All Over*) programs. **Radio Australia**, in turn, still produces its own regional programming (*Pacific Beat*, for example) as well as programming (especially *Asia Pacific*, but also several educational series) that is also carried by one or more domestic radio network.

This more evolved relationship, with programming moving in both directions, could serve as a model for other international and national radio services seeking to advance and solidify their own relationships.

◆ Half Full or Half Empty?

This preservation strategy is not restricted to English language services. **Deutsche Welle** (German), **Radio Norway International** (Norwegian), **Radio Österreich International** (German) and other European stations, like **Radio Exterior de España** (Spanish), **RAI** (Italian) and **RDP** (Portuguese) have replaced parts or all of their previously distinct international services with shortwave relays of their domestic networks.

So, these arrangements clearly address one problem – and quite successfully it would seem at this point. However, they raise another issue – one which we will address in February.

[All of the English language programs described above appear in *MT's Shortwave Guide* listings.]



HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af
 ① ② ⑤ ③ ④ ⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Standard Time) 5, 6, 7, or 8 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each page.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC *Sunday* will be heard on *Saturday* evening in America (in other words, 7:30 pm Eastern, 6:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ①, then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not *daily*, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Day Codes

s/S	Sunday
m/M	Monday
t/T	Tuesday
w/W	Wednesday
h/H	Thursday
f/F	Friday
a/A	Saturday
D	Daily
mon/MON	monthly

In the same column ⑤, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑥ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-

term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before print deadline.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East
na:	North America
om:	omnidirectional
pa:	Pacific
sa:	South America
va:	various

Choose a program or station you want to hear.

Selected programs for prime listening hours appear following the frequencies – space does not permit 24 hour listings nor can every station be listed. However, listings for the most popular stations and selected lesser-known stations illustrate the variety available on shortwave. The format of the listings alternates among three different styles – by station, by genre and by day – month by month. Times listed are approximate and programs are subject to change.

The program listings emphasize broadcasts targeted to North America. In most cases, the stations and programs listed should be readily receivable in North America using a portable radio. Most broadcasters produce one broadcast in English per day that is repeated over a 24 hour period to all areas. If you are able to listen to transmissions to other areas of the world during "non-prime time" hours, referring to the prime time listings for those stations will likely be helpful in determining what programs will be broadcast.

Occasionally, a program or station listing may be followed by a reference to another listing for the same program or station at a different time. This is done to conserve space and make it possible to provide more listings.

MT MONITORING TEAM

Gayle Van Horn John Figliozi
 Frequency Manager Program Manager
 gaylevanhorn@monitoringtimes.com johnfigliozi@monitoringtimes.com

Mark Fine, VA
 markfine@monitoringtimes.com

Program Highlights

John Figliozi

Kim Elliott is Back

It's not the half hour he had with *Communications World*, but **Kim Elliott** is back on the air with a weekly Sunday (UTC) segment on international media within the VOA's *Main Street* program. *Main Street*, which in itself is a welcome addition to the VOA schedule, airs S-H at 0233, 0433, 0633, 1033 and 2233 UT. Hosted by **Barbara Klein**, the program attempts to give listeners a more complete sense of what America is all about. [Refer to MT's *Shortwave Guide* and try the various frequencies listed to see what works best for your location.]

Welcome back, Kim.

More HCJB Changes

The Voice of the Andes has been undergoing a series of changes as of late, some of which evoke mixed feelings in some longtime listeners. **HCJB's** "home grown" (for the most part) feature block has been moved back one hour to 0000 and 0300 UT respectively and these may be more convenient broadcast times. However, the station's long term commitment to focused coverage of Latin America appears to have been dealt another blow. *Studio 9*, the daily magazine program, no longer concentrates on Latin America, instead opting for a generalized, more global view. It appears **HCJB's** efforts to construct facilities in Australia, once again, has had a less than beneficial effect on its service from Ecuador.

RCI Mornings Set

This month's *Guide* finally includes the new weekday morning line-up on **Radio Canada International**. *The Current* (1305 UT) is a new daily newsmagazine concentrating on breaking news and issues. *Sounds Like Canada* follows (1405 UT) and attempts to paint a national portrait using interviews, features, music and on-location broadcasts. Both programs originate from CBC Radio One, and are a result of efforts to revitalize the radio service to better reflect the growing diversity and changing nature of Canadian society.

ROI Under Threat

Radio Austria International is asking listeners to write in support of the English service. Send e-mails to <roi.service@orf.at>. Note the new program *Paul Catty's My Music* (S 1704) in ROI's English schedule.



0000 UTC - 7PM E / 6PM C / 4PM P

0000	0015	Cambodia, National Radio Of	11940as			
0000	0015	Japan, Radio	6145na	13650as	17810as	
0000	0030	Egypt, Radio Cairo	9900am			
0000	0030	mtwhf/vl	Solomon Islands, SIBC	5020do	9545do	
0000	0030		Sri Lanka, SLBC	4940as		
0000	0030		Thailand, Radio	9680va		
0000	0030		UK, BBC World Service	3915as	5970as	11945as 17615as
0000	0045		India, All India Radio	9705as	9950as	11620as 13605as
0000	0055		Spain, R Exterior Espana	6055am		
0000	0057		Canada, Radio Canada Intl	9755as	11895as	9755as 11895as
0000	0059		Canada, Radio Canada Intl	5960na	9590na	
0000	0100		Anguilla, Caribbean Beacon	6090am		
0000	0100		Australia, ABC NT Alice Springs	4810eu	9960eu	
0000	0100		Australia, ABC NT Katherine	5025do		
0000	0100		Australia, ABC NT Tennant Crk	4910do		
0000	0100		Australia, Radio	5995va	9475as	9580va 9660pa 11650va
			11660as 12080va	15240pa	15415as	17775as 17580pa 17795va
			21725va			
0000	0100		Bulgaria, Radio	7400na	9400na	
0000	0100		Canada, CBC Northern Service	9625do		
0000	0100		Canada, CFRX Toronto ON	6070do		
0000	0100		Canada, CFVP Calgary AB	6030do		
0000	0100		Canada, CKZN St John's NF	6160do		
0000	0100		Canada, CKZU Vancouver BC	6160do		
0000	0100		Costa Rica, R for Peace Intl	7445am	15040am	
0000	0100		Costa Rica, University Network	5030am	6150am	7375am 9725sa
			11870am 13750na			
0000	0100		Germany, Deutsche Welle	6040am	6145am	9640am 9700na
			9765na			
0000	0100		Guyana, Voice of	3290do	5950do	
0000	0100		Malaysia, Radio	7295do		
0000	0100		Namibia, NBC	3270af	3290af	
0000	0100		Netherlands, Radio	6165na	9845na	
0000	0100		New Zealand, Radio NZ Intl	17675pa		
0000	0100		Russia, University Network	9890as		
0000	0100		Singapore, SBC Radio One	6150do		
0000	0100		UAE, AWR	6035as	6055as	
0000	0100		UK, BBC World Service	5975va	6195as	7105as 9410va 9825sa
			11955as 12095va	15280as	15310as	15360as 17790as
0000	0100		USA, Armed Forces Network	3903usb	4278usb	4319usb 4993usb
			6350usb 6458usb	10320usb	12579usb	12689usb 13362usb
0000	0100		USA, KAUJ Dallas TX	5755va		
0000	0100		USA, KIMF Otero NM	5835na		
0000	0100		USA, KTBN Salt Lk City UT	7505na		
0000	0100		USA, KWHR Naalehu HI	17510as		
0000	0100		USA, Voice of America	7215va	9890va	11760va 15185va 15290va
			17740va 17820va			
0000	0100	twfha	USA, Voice of America	5995am	6130am	7405am 9455am 9775am
			11695am 13710am			
0000	0100		USA, WBCQ Kennebunk, ME	7415na	9335na	11660na
0000	0100		USA, WEWN Birmingham AL	5825na		
0000	0100		USA, WHRA Greenbush ME	7580va		
0000	0100		USA, WHRI Noblesville IN	5745va	7315am	
0000	0100		USA, WINB Red Lion PA	12160am		
0000	0100		USA, WJIE Louisville KY	7490am	13595am	
0000	0100	sm	USA, WRMI Miami FL	9955am		
0000	0100	twfha	USA, WRMI Miami FL	7385na		
0000	0100		USA, WRNO New Orleans LA	7355am		
0000	0100	as	USA, WSHB Cypress Creek SC	9430am		
0000	0100	wf	USA, WSHB Cypress Creek SC	9430am	15285am	
0000	0100		USA, WTJC Newport NC	9370na		
0000	0100	sm	USA, WWBS Macon GA	11900na		
0000	0100		USA, WWCR Nashville TN	3210na	5070na	5935na 7465na
0000	0100		USA, WWRB Manchester TN	5050na	5085na	6890na
0000	0100		USA, WYFR Okeechobee FL	6085na	9505na	11720na
0000	0100	vl	Vanuatu, Radio	3945al	7260do	
0000	0100		Zambia, Christian Voice	4965do		
0000	0130		UAE, Gospel For Asia	6145as		
0005	0012		Croatia, Croatian Radio	9925sa		
0030	0100		Australia, Radio	17750as		
0030	0100		Iran, VOIRI	6015am	6135am	9580am
0030	0100		Lithuania, R Vilnius	7325na		
0030	0100	as	Russia, Bible Voice BC	12035as		
0030	0100	as	Russia, Bible Voice BC	12035as		
0030	0100	as/vl	Solomon Islands, SIBC	5020do	9545do	
0030	0100		Sri Lanka, SLBC	4940as	6005as	6075as 9770as 15745as
0030	0100		Thailand, Radio	13695na		
0045	0100		Pakistan, Radio	11655as	15455as	
0055	0100		Italy, RAI Intl	9675na	11800na	

0100 UTC - 8PM E / 7PM C / 5PM P

0100	0115	Italy, RAI Intl	9675na	11800na		
0100	0115	Pakistan, Radio	11655as	15455as		
0100	0125	Netherlands, Radio	6165na	9845na		
0100	0127	Czech Rep, Radio Prague Intl		6200na	7345na	
0100	0127	Iran, VOIRI	6015na	6135na	9580am	
0100	0127	Vietnam, Voice of	6175na			
0100	0130	Australia, Radio	17775as			
0100	0130	mtwhfa	Bosnia/Serbia, R. Yugoslavia	7115eu		
0100	0130	s	Germany, Universal Life	9435as		
0100	0130		Hungary, Radio Budapest	9835na		
0100	0130	as	Russia, Bible Voice BC	12035as		
0100	0130		Slovakia, RSlovakia Intl	5930am	7230am	9440am
0100	0130		UAE, Gospel For Asia	6145as		
0100	0130	twfha	USA, Voice of America	5995am	6130am	7405am 9455am 9775am
			13710am			
0100	0130		Uzbekistan, Radio Tashkent	5955as	5975as	7135as 7215as
0100	0145		Germany, Deutsche Welle	6040am	6145am	9640am 9700na
			9765na			
0100	0156		China, China Radio Intl	9580na	9790na	
0100	0156		North Korea, Voice of	3560as	6195as	6520am 7140as 7580am
			9345as 11735am			
0100	0200		Anguilla, Caribbean Beacon	6090am		
0100	0200		Australia, ABC NT Katherine	5025do		
0100	0200		Australia, ABC NT Tennant Crk	4910do		
0100	0200		Australia, Radio	5995va	9580va	9660pa
			11650va 11660va	12080va	15240pa	15415as 17750as
			17580pa 17795va	21725va		
0100	0200	vl	Austria, AWR	9835as		
0100	0200		Canada, CBC Northern Service	9625do		
0100	0200		Canada, CFRX Toronto ON	6070do		
0100	0200		Canada, CFVP Calgary AB	6030do		
0100	0200		Canada, CKZN St John's NF	6160do		
0100	0200		Canada, CKZU Vancouver BC	6160do		
0100	0200		Costa Rica, R for Peace Intl	7445am	15040am	
0100	0200		Costa Rica, University Network	5030am	6150am	7375am 9725sa
			11870am 13750na			
0100	0200		Cuba, Radio Havana	6090na	9820na	11705usb
0100	0200		Ecuador, HCJB	9745na	21455usb	
0100	0200		Guyana, Voice of	3290do	5950do	
0100	0200		Indonesia, Voice of	9525va	11785al	15150al
0100	0200		Japan, Radio	11860as	11880af	15325as 17685 ac
			17810as 17835sa	17845na		
0100	0200		Kyrgyz, Kyrgyz Radio	4010as	4795as	
0100	0200		Namibia, NBC	3270af	3290af	
0100	0200		New Zealand, Radio NZ Intl	17675pa		
0100	0200		Russia, University Network	9890as		
0100	0200		Singapore, SBC Radio One	6150do		
0100	0200	vl	Solomon Islands, SIBC	5020do	9545do	
0100	0200		Sri Lanka, SLBC	4940as	6005as	6075as 9770as
			15745as			
0100	0200		UK, BBC World Service	5975va	6195as	9410as 9525sa 9825am
			11955as 12095va	15280as	15310as	15360as 17790as
0100	0200		Ukraine, R Ukraine Intl	5905as	9610as	9810as
0100	0200		USA, Armed Forces Network	3903usb	4278usb	4319usb
			4993usb 6350usb	6458usb	10320usb	12579usb 12689usb
			13362usb			
0100	0200		USA, KAUJ Dallas TX	5755va		
0100	0200		USA, KIMF Otero NM	5835na		
0100	0200		USA, KTBN Salt Lk City UT	7505na		
0100	0200		USA, KWHR Naalehu HI	17510as		
0100	0200		USA, Voice of America	7200va	9850va	11705va 11820va
			15250va 15300va	17740va	17820va	
0100	0200		USA, WBCQ Kennebunk, ME	7415na	9335na	11660na
0100	0200		USA, WEWN Birmingham AL	5825na		
0100	0200		USA, WHRA Greenbush ME	7580va		
0100	0200		USA, WHRI Noblesville IN	5745va	7315am	
0100	0200		USA, WINB Red Lion PA	12160am		
0100	0200		USA, WJIE Louisville KY	7490am	13595am	
0100	0200	sm	USA, WRMI Miami FL	9955am		
0100	0200	twfha	USA, WRMI Miami FL	7385na		
0100	0200		USA, WRNO New Orleans LA	7355am		
0100	0200	twfhas	USA, WSHB Cypress Creek SC	9430na		
0100	0200		USA, WTJC Newport NC	9370na		
0100	0200	sm	USA, WWBS Macon GA	11900na		
0100	0200		USA, WWCR Nashville TN	3210na	5070na	5935na 7465na
0100	0200		USA, WWRB Manchester TN	5050na	5085na	6890na
0100	0200		USA, WYFR Okeechobee FL	6065na	9505na	15060as
0100	0200		Zambia, Christian Voice	4965do		
0110	0200	as	Australia, Radio	9660va	12080pa	17580pa 21725as
0130	0145	vl	Libya, Voice of Africa	15435irr	21695irr	

SELECTED PROGRAMMING BEGINS ON PAGE 55

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0130	0200	Australia, Voice International	17775as				
0130	0200	Iran, VOIRI 6135na	9580na				
0130	0200	Sweden, Radio	9495as				
0130	0200	UK, RTE Radio	6155na				
0130	0200	twfha USA, Voice of America	5995am	6130am	7405am	9455am	9775am
			13740am				
0138	0150	Croatia, Croatian Radio	9925sa				
0140	0200	Vatican City, Vatican Radio	7335as	9865as			

0200 UTC - 9PM E / 8PM C / 6PM P

0200	0210	Bangladesh, Bangla Betar	4882as				
0200	0227	Czech Rep, Radio Prague Intl	6200na	7345na			
0200	0227	Iran, VOIRI 6135na	9580na				
0200	0230	twfha Argentina, RAE	6060am	11710am			
0200	0230	Bosnia/Serbia, R. Yugoslavia	7130eu				
0200	0230	as/vl Solomon Islands, SIBC	5020do	9545do			
0200	0245	Germany, Deutsche Welle	7285as	9765as	11965as	13605as	
0200	0256	North Korea, Voice of	9325as	11335as	11845as		
0200	0257	Canada, Radio Canada Intl	15150as	17860as			
0200	0259	Canada, Radio Canada Intl	6040am	9755am	11725am		
0200	0259	Romania, R Romania Intl	9550na	9625as	11740as		
			15370au				
0200	0300	Anguilla, Caribbean Beacon	6090am				
0200	0300	Australia, ABC NT Alice Springs	4810eu	9960eu			
0200	0300	Australia, ABC NT Katherine	5025do				
0200	0300	Australia, ABC NT Tennant Crk	4910do				
0200	0300	Australia, Radio	5995va	9475as	9580va	9660pa	11650va
			12080va	15240pa	15415as	15515as	17580pa
0200	0300	as Australia, Radio	9660va	12080pa	17580pa	21725as	
0200	0300	Canada, CBC Northern Service	9625do				
0200	0300	Canada, CFRX Toronto ON	6070do				
0200	0300	Canada, CFVP Calgary AB	6030do				
0200	0300	Canada, CKZN St John's NF	6160do				
0200	0300	Canada, CKZU Vancouver BC	6160do				
0200	0300	Costa Rica, R for Peace Intl	7445am	15040am			
0200	0300	Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na			
0200	0300	Cuba, Radio Havana	6090na	9820na	11705usb		
0200	0300	Ecuador, HCJB	9745na	12040as	21455usb		
0200	0300	Egypt, Radio Cairo	9475am				
0200	0300	Guyana, Voice of	3290do	5950do			
0200	0300	Malaysia, Radio	7295do				
0200	0300	Myanmar, Radio	7185do				
0200	0300	Namibia, NBC	3270af	3290af			
0200	0300	New Zealand, Radio NZ Intl	17675pa				
0200	0300	Philippines, Radio Pilipinas	12015me	15120me	15270me		
0200	0300	Russia, University Network	9890as				
0200	0300	Russia, Voice of Russia	6155na	7180na	9765na	12020na	
			13665na	15445na			
0200	0300	Singapore, SBC Radio One	6150do				
0200	0300	mtwhf/vl Solomon Islands, SIBC	5020do	9545do			
0200	0300	South Korea, R Korea Intl	9560va	11810va	15575va		
0200	0300	Sri Lanka, SLBC	6005as	6075as	6130do	9770as	15745as
0200	0300	Taiwan, R Taipei Intl	5950na	9680na	11740na	15320as	15345as
0200	0300	UK, BBC World Service	5975va	6005af	9410me	9525am	9770af
0200	0300		9825sa	11760na	11955as	12035af	12095va
			15360as	17790as			
0200	0300	USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
			6350usb	6458usb	10320usb	12579usb	12689usb
0200	0300	USA, KAUJ Dallas TX	5755va				
0200	0300	USA, KIMF Otero NM	5835na				
0200	0300	USA, KJES Vado NM	7555na				
0200	0300	USA, KTBN Salt Lk City UT		7505na			
0200	0300	USA, KWHR Naalehu HI	17510as				
0200	0300	USA, Voice of America	7200va	9850va	11705va	11820va	15250va
			15300va	17740va	17820va		
0200	0300	USA, WBCQ Kennebunk, ME	7415na	9335na	11660na		
0200	0300	USA, WEWN Birmingham AL	5825na				
0200	0300	USA, WHRA Greenbush ME	7580va				
0200	0300	USA, WHRI Noblesville IN	5745va	7315am			
0200	0300	USA, WINB Red Lion PA	9320am				
0200	0300	USA, WJIE Louisville KY	7490am	13595am			
0200	0300	sm WRM Miami FL	9955am				
0200	0300	twfha WRM Miami FL	7385na				
0200	0300	USA, WRNO New Orleans LA		7355am			
0200	0300	s WSHB Cypress Creek SC	9430na				
0200	0300	h WSHB Cypress Creek SC	7535am				
0200	0300	USA, WTJC Newport NC	9370na				
0200	0300	USA, WWCN Nashville TN	3210na	5070na	5935na	7465na	
0200	0300	USA, WWRB Manchester TN	5050na	5085na	6890na		
0200	0300	USA, WYFR Okeechobee FL	6065na	9505na			
0200	0300	Zambia, Christian Voice	4965do				
0200	1215	Cambodia, National Radio Of		11940as			
0205	0222	Croatia, Croatian Radio	9925na				

0215	0220	Nepal, Radio	3230as	5005as	6100as	7164as
0230	0257	Vietnam, Voice of	6175na			
0230	0300	Austria, Radio Austria Intl	7325na			
0230	0300	Iraq, Radio Iraq Intl	9687ing	11787eu		
0230	0300	Sweden, Radio	9495na			
0245	0300	twfha Albania, Radio Tirana Intl	6115na	7160eu		
0250	0300	Vatican City, Vatican Radio	7305am	9605am		

0300 UTC - 10PM E / 9PM C / 7PM P

0300	0310	Vatican City, Vatican Radio	7305am	9605am	9660af		
0300	0330	Australia, Radio	9580va				
0300	0330	sm w fa Belarus, Radio Belarus Intl	5970eu	7210eu			
0300	0330	Egypt, Radio Cairo	9475am				
0300	0330	South Africa, Channel Africa		9525af			
0300	0330	Thailand, Radio	15460na				
0300	0330	a UK, Wales Radio Intl	9835na				
0300	0330	USA, KJES Vado NM	7555na				
0300	0345	Germany, Deutsche Welle		6020na	6045na	9640am	9700na
			11985na				
0300	0356	China, China Radio Intl	9560na				
0300	0356	North Korea, Voice of	3560as	6195as	7140as	9345as	
0300	0358	Hungary, Radio Budapest		9835na			
0300	0400	Anguilla, Caribbean Beacon		6090am			
0300	0400	Australia, ABC NT Alice Springs		4810eu	9960eu		
0300	0400	Australia, ABC NT Katherine		5025do			
0300	0400	Australia, ABC NT Tennant Crk		4910do			
0300	0400	Australia, Radio	5995va	9500pa	9660pa	9815pa	11650va
			12080va	15240pa	15415as	15515as	17580pa
0300	0400as	Australia, Radio	9660va	12080pa	17580pa	21725as	
0300	0400	vi Botswana, Radio	3356do	4820do	7255do		
0300	0400	Bulgaria, Radio	7400na	9400na			
0300	0400	Canada, CBC Northern Service		9625do			
0300	0400	Canada, CFRX Toronto ON		6070do			
0300	0400	Canada, CFVP Calgary AB		6030do			
0300	0400	Canada, CKZN St John's NF		6160do			
0300	0400	Canada, CKZU Vancouver BC		6160do			
0300	0400	Costa Rica, R for Peace Intl		7455am	15040am		
0300	0400	Costa Rica, University Network		5030am	6150am	7375am	9725sa
			11870am	13750na	17645as		
0300	0400	Cuba, Radio Havana		6090na	9820na	11705usb	
0300	0400	Ecuador, HCJB		9745na	12040as	21455usb	
0300	0400	vi Guatemala, Radio Cultural		3300do	5955do		
0300	0400	Guyana, Voice of		3290do	5950do		
0300	0400	Japan, Radio		17825ca	21610	ac	
0300	0400	Malaysia, Radio		7295do			
0300	0400	Namibia, NBC		3270af	3290af		
0300	0400	New Zealand, Radio NZ Intl		17675pa			
0300	0400	Oman, Radio		15355af			
0300	0400	Russia, University Network		9890as			
0300	0400	Russia, Voice of Russia		6155na	7180na	12020na	13665na
				15445na			
0300	0400	Singapore, SBC Radio One		6150do			
0300	0400	mtwhf/vl Solomon Islands, SIBC		5020do	9545do		
0300	0400	Sri Lanka, SLBC		6005as	6075as	6130do	9770as
0300	0400	Taiwan, R Taipei Intl		5950na	9680na	11875as	15320as
0300	0400	Uganda, Radio		4976do	5026do	7196do	
0300	0400	UK, BBC World Service		3255af	5975va	6005af	6190af
				7160af	9410va	11760va	12095as
				15280as	15310as	15575va	17640as
				21660as			
0300	0400	USA, Armed Forces Network		3903usb	4278usb	4319usb	4993usb
				6350usb	6458usb	10320usb	12579usb
0300	0400	USA, KAUJ Dallas TX		5755va			
0300	0400	USA, KIMF Otero NM		5835na			
0300	0400	USA, KTBN Salt Lk City UT		7505na			
0300	0400	USA, KWHR Naalehu HI		17510as			
0300	0400	USA, Voice of America		4960af	6035af	6080af	7265af
				7340af	7415af	9575af	9885af
0300	0400	USA, WBCQ Kennebunk, ME		7415na	9335na	11660na	
0300	0400	USA, WEWN Birmingham AL		5825na			
0300	0400	USA, WHRA Greenbush ME		7580va			
0300	0400	USA, WHRI Noblesville IN		5745va	7315am		
0300	0400	USA, WINB Red Lion PA		9320am			
0300	0400	USA, WJIE Louisville KY		7490am	13595am		
0300	0400	USA, WRM Miami FL		7385na			
0300	0400	USA, WRNO New Orleans LA		7395am			
0300	0400	USA, WTJC Newport NC		9370na			
0300	0400	USA, WWCN Nashville TN		3210na	5070na	5935na	7465na
0300	0400	USA, WWRB Manchester TN		5050na	5085na	6890na	
0300	0400	USA, WYFR Okeechobee FL		5985na	6065na	9505na	
				11855na			
0300	0400	Zambia, Christian Voice		6065do			
0310	0330	Vatican City, Vatican Radio		9660af			
0330	0345	vi Libya, Voice of Africa		15435irr	21695irr		

Shortwave Guide



0330	0350	UAE, Emirates Radio	12005na	13675na	15395na
0330	0357	Vietnam, Voice of	6175na		
0330	0400	Albania, Radio Tirana Intl	6115na	7160eu	
0330	0400	Malaysia, RTM Kota Kinabalu	5979do		
0330	0400	Nigeria, Radio/Kaduna	4770do		
0330	0400	Nigeria, Radio/Lagos	3326do	4990al	
0330	0400	Sweden, Radio	9495na		
0330	0400	UK, BBC World Service	15420af		
0338	0350	Croatia, Croatian Radio	9925na		
0345	0400	Seychelles, FEBA Radio	11885af		
0345	0400	Tajikistan, Radio	7245as		

0400 UTC - 11PM E / 10PM C / 8PM P

0400	0425	Belgium, Radio Vlaanderen Intl	11985na		
0400	0427	Czech Rep, Radio Prague Intl	7345na	7385na	9435na
0400	0430	France Radio France Intl	11910af		
0400	0430	Guatemala, Radio Cultural	3300do	5955do	
0400	0430	Mexico, Radio Mexico Intl	9705am	11770am	
0400	0430	South Africa, AWR	9650af		
0400	0430	South Africa, Channel Africa	5955af		
0400	0430	Sri Lanka, SLBC	6005as	6075as	6130do 9770as 15745as
0400	0445	Germany, Deutsche Welle	6180af	7195af	9565af 9710af
0400	0445	USA, WYFR Okeechobee FL	6065na	9505na	9985eu 11530eu
0400	0450	Turkey, Voice of	6020va	7240va	
0400	0456	China, China Radio Intl	9730na		
0400	0456	Romania, R Romania Intl	9550na	11830na	15335as 17735as
0400	0500	Anguilla, Caribbean Beacon	6090am		
0400	0500	Australia, ABC NT Alice Springs	4810eu	9960eu	
0400	0500	Australia, ABC NT Katherine	5025do		
0400	0500	Australia, ABC NT Tennant Crk	4910do		
0400	0500	Australia, Radio	5995va	6080pa	7240pa 9500as 9660pa
			9815pa 11650va 12080va	15240pa	15415as 15515va
			17580pa 21725va		
0400	0500	Australia, Radio	9660va	12080pa	17580pa 21725as
0400	0500	Botswana, Radio	3356do	7255do	
0400	0500	Canada, CBC Northern Service	9625do		
0400	0500	Canada, CFRX Toronto ON	6070do		
0400	0500	Canada, CKZN St John's NF	6160do		
0400	0500	Canada, CKZU Vancouver BC	6160do		
0400	0500	Costa Rica, R for Peace Intl	7455am	15040am	
0400	0500	Costa Rica, University Network	5030am	6150am	7375am 9725sa
			11870am 13750na 17645as		
0400	0500	Cuba, Radio Havana	6090na	9820na	11705usb
0400	0500	Ecuador, HCJB	9745na	21455usb	
0400	0500	Guyana, Voice of	3290do	5950do	
0400	0500	Malaysia, Radio	7295do		
0400	0500	Malaysia, RTM Kota Kinabalu	5979do		
0400	0500	Namibia, NBC	3270af	3290af	
0400	0500	New Zealand, Radio NZ Intl	17675pa		
0400	0500	Nigeria, Radio/Kaduna	4770do	6090do	
0400	0500	Nigeria, Radio/Lagos	3326do	4990al	
0400	0500	Russia, University Network	17765as		
0400	0500	Russia, Voice of Russia	7125na	7180na	12020na 13665na
			15445na 15595na 17595na		
0400	0500	Russia, Voice of Russia	12010na		
0400	0500	Singapore, SBC Radio One	6150do		
0400	0500	Solomon Islands, SIBC	5020do	9545do	
0400	0500	Uganda, Radio	4976do	7196do	
0400	0500	UK, BBC World Service	3255af	6005af	6135am 6190af 6195eu
			7160af 9410va 9525am	11760af	12035af 12095as
			15280as 15310as 15360as	15420af	15575va 17640as 17760as
			17790as 21660as		
0400	0500	Ukraine, R Ukraine Intl	6020as	7285as	9810as
0400	0500	USA, Armed Forces Network	3903usb	4278usb	4319usb 4993usb
			6350usb 6458usb 10320usb	12579usb	12689usb 13362usb
0400	0500	USA, KAUJ Dallas TX	5755va		
0400	0500	USA, KJMF Otero NM	5835na		
0400	0500	USA, KTBN Salt Lk City UT	7505na		
0400	0500	USA, KWHR Naalehu HI	17780as		
0400	0500	USA, Voice of America	4960af	6080af	7170va 7290af 9525af
			9775af 9885af 15205af		
0400	0500	USA, WBCQ Kennebunk, ME	7415na	9335na	11660na
0400	0500	USA, WEWN Birmingham AL	5825na		
0400	0500	USA, WHRA Greenbush ME	7580va		
0400	0500	USA, WHRI Noblesville IN	5745va	7315am	
0400	0500	USA, WJIE Louisville KY	7490am	13595am	
0400	0500	USA, WMLK Bethel PA	9465eu	9955eu	
0400	0500	USA, WRMI Miami FL	7385na		
0400	0500	USA, WRNO New Orleans LA	7395am		
0400	0500	USA, WSHB Cypress Creek SC	12020af		
0400	0500	USA, WTJC Newport NC	9370na		
0400	0500	USA, WWCR Nashville TN	3210na	5070na	5935na 7465na
0400	0500	USA, WWRB Manchester TN	5950na	5085na	6890na
0400	0500	Zambia, Christian Voice	6065do		

0404	0500	USA, WYFR Okeechobee FL	9715na		
0405	0412	Croatia, Croatian Radio	9925na		
0427	0500	Madagascar, Radio VO Hope	12060af	15320af	
0430	0457	Czech Rep. Radio Prague Intl	9865va	11600va	
0430	0500	Australia, Radio	17750as		
0430	0500	Netherlands, Radio	6165na	9590na	
0430	0500	Nigeria, Radio/Enugu	6025do		
0430	0500	Nigeria, Radio/Ibadan	6050do		
0430	0500	South Africa, AWR	12080af		
0430	0500	Sri Lanka, SLBC	6130do		
0430	0500	Swaziland, TWR	4775af	6120af	
0430	0500	UAE, AWR	15160as		
0445	0500	Italy, RAI Intl	5965af	6100af	7235af
0450	0800	Monaco, TWR	9870eu		

0500 UTC - 12AM E / 11PM C / 9PM P

0500	0505	New Zealand, Radio NZ Intl	17675pa		
0500	0515	Israel, Kol Israel	6280va	9435va	17600va
0500	0530	Australia, Radio	9500as		
0500	0530	France Radio France Intl	13610af	15155af	
0500	0530	Mexico, Radio Mexico Intl	9705am	11770am	
0500	0530	Netherlands, Radio	6165na	9590na	
0500	0530	South Africa, AWR	6015af		
0500	0530	South Africa, Channel Africa		11710af	
0500	0530	UK, BBC World Service	15280as		
0500	0530	Vatican City, Vatican Radio	9660af	11625af	15570af
0500	0545	Germany, Deutsche Welle	5960na	6120na	9670na
			11795na		
0500	0556	China, China Radio Intl	9560na		
0500	0600	Anguilla, Caribbean Beacon	6090am		
0500	0600	Australia, ABC NT Alice Springs	4810eu	9960eu	
0500	0600	Australia, ABC NT Katherine	5025do		
0500	0600	Australia, ABC NT Tennant Crk	4910do		
0500	0600	Australia, Radio	5995va	6080pa	7240pa 9660pa 9815pa
			11880va 12080va 15240pa	15415as	15515va 17580pa 21725va
0500	0600	Australia, Radio	9660va	12080pa	17580pa 21725as
0500	0600	Bhutan, Bhutan BC Service	5030al	6035do	
0500	0600	Botswana, Radio	3356do	4820do	7255do
0500	0600	Canada, CBC Northern Service	9625do		
0500	0600	Canada, CFRX Toronto ON	6070do		
0500	0600	Canada, CKZN St John's NF	6160do		
0500	0600	Canada, CKZU Vancouver BC	6160do		
0500	0600	Costa Rica, R for Peace Intl	7455am	15040al	
0500	0600	Costa Rica, University Network	5030am	6150am	7375am 9725sa
			11870am 13750na 17645as		
0500	0600	Cuba, Radio Havana	9550na	9820na	9830usb
0500	0600	Ecuador, HCJB	9745na	21455usb	
0500	0600	Guyana, Voice of	3290do	5950do	
0500	0600	Japan, Radio	5975eu	6110na	7230eu 9835eu 15195as
			13630na 15195as 17810as	21755	cc
0500	0600	Kuwait, Radio	15110as		
0500	0600	Malaysia, Radio	7295do		
0500	0600	Malaysia, RTM Kota Kinabalu	5979do		
0500	0600	Namibia, NBC	6060af	6175af	
0500	0600	Nigeria, Radio/Enugu	6025do		
0500	0600	Nigeria, Radio/Ibadan	6050do		
0500	0600	Nigeria, Radio/Kaduna	4770do	6090do	9570do
0500	0600	Nigeria, Radio/Lagos	3326do	4990al	
0500	0600	Nigeria, Voice of	7255af	15150af	
0500	0600	Russia, University Network	17765as		
0500	0600	Russia, Voice of Russia	12010	nq	
0500	0600	Russia, Voice of Russia	7180na	7180na	12020na 13665na
			15445na 15595na		
0500	0600	Singapore, SBC Radio One	6150do		
0500	0600	Solomon Islands, SIBC	5020do	9545do	
0500	0600	Swaziland, TWR	6120af	7205af	9500af
0500	0600	Uganda, Radio	4976do	5026do	7196do
0500	0600	UK, BBC World Service	6005af	6135am	6195eu 7160af
			9410va 11760va 11765af	6190af	6195as 15310as 15360as
			15420af 15565va 15575va	17640af	17760as 17790as 17885af
			21660as		
0500	0600	USA, Armed Forces Network	3903usb	4278usb	4319usb 4993usb
			6350usb 6458usb 10320usb	12579usb	12689usb 13362usb
0500	0600	USA, KAUJ Dallas TX	5755va		
0500	0600	USA, KJMF Otero NM	5835na		
0500	0600	USA, KTBN Salt Lk City UT	7505na		
0500	0600	USA, KWHR Naalehu HI	17780as		
0500	0600	USA, Voice of America	6035af	6080af	7170va 7295af 9700va
			11825va 11835af 13710af	15205va	
0500	0600	USA, WBCQ Kennebunk, ME	7415na		
0500	0600	USA, WBCQ Kennebunk, ME	9335na		
0500	0600	USA, WEWN Birmingham AL	5825na		
0500	0600	USA, WHRA Greenbush ME	7580va		
0500	0600	USA, WHRI Noblesville IN	5745va	7315am	

Shortwave Guide



0500	0600	USA, WJIE Louisville KY	7490am	13595am			
0500	0600	USA, WMLK Bethel PA	9465eu	9955eu			
0500	0600	USA, WRMI Miami FL	7385na				
0500	0600	USA, WRNO New Orleans LA	7395am				
0500	0600	USA, WSHB Cypress Creek SC	12020af				
0500	0600	USA, WTJC Newport NC	9370na				
0500	0600	USA, WWCR Nashville TN	3210na	5070na	5935na	7560na	
0500	0600	USA, WWRB Manchester TN	5950na	5085na	6890na		
0500	0600	USA, WYFR Okeechobee FL	5810na				
0500	0600	Zambia, Christian Voice	6065do				
0506	0600	New Zealand, Radio NZ Intl	15340pa				
0525	0600	Ghana, Ghana BC Corp	3366do	4915do			
0530	0550	UAE, Emirates Radio	15435au	17830au	21695au		
0530	0600	Australia, Radio	17750as				
0530	0600	South Africa, AWR	15345af				
0530	0600	Thailand, Radio	13780eu				
0538	0550	Croatia, Croatian Radio	9925na				

0600 UTC - 1AM E / 12AM C / 10PM P

0600	0615	South Africa, TWR	11640af				
0600	0620	Vatican City, Vatican Radio	4005af	5890eu	7250eu		
0600	0630	France Radio France Intl	11710af				
0600	0630	South Africa, Channel Africa	15215af				
0600	0637	Romania, R Romania Intl	9530na	11829na			
0600	0645	Germany, Deutsche Welle	7225af	9565af	11785af		
0600	0700	Anguilla, Caribbean Beacon	6090am				
0600	0700	Australia, ABC NT Alice Springs	4810eu	9960eu			
0600	0700	Australia, ABC NT Katherine	5025do				
0600	0700	Australia, ABC NT Tennant Crk	4910do				
0600	0700	Australia, Radio	7240va	9660pa	9815pa	11880va	12080va
		13620as	15320as	15240pa	15415as	15515va	17580pa
							17750as
			21725va				
0600	0700	as	Australia, Radio	9660va	12080pa	17580pa	21725as
0600	0700	vi	Botswana, Radio	3356do	4820do	7255do	
0600	0700		Canada, CFRX Toronto ON	6070do			
0600	0700		Canada, CFVP Calgary AB	6030do			
0600	0700		Canada, CKZN St John's NF	6160do			
0600	0700		Canada, CKZU Vancouver BC	6160do			
0600	0700		Costa Rica, R for Peace Intl	7455am	15040al		
0600	0700		Costa Rica, University Network	5030am	6150am	7375am	9725sa
			11870am	13750na	17645as		
0600	0700		Cuba, Radio Havana	9550na	9820na	9830usb	
0600	0700		Germany, Deutsche Welle	6140eu			
0600	0700	vi	Ghana, Ghana BC Corp	3366do	4915do		
0600	0700		Greece, Voice of	9420eu	15630eu		
0600	0700		Guyana, Voice of	3290do	5950do		
0600	0700		Japan, Radio	7230eu	9835na	11715va	11760va
			15195as	17870pa	21755ac	11740as	
0600	0700		Kuwait, Radio	15110as			
0600	0700		Liberia, ELWA	4760do			
0600	0700		Liberia, R Liberia Intl	6100do			
0600	0700		Malaysia, Radio	7295do			
0600	0700		Malaysia, Voice of	6175as	9750as	15295as	
0600	0700		Namibia, NBC	3270af	3290af		
0600	0700		New Zealand, Radio NZ Intl	15340pa			
0600	0700		Nigeria, Radio/Enugu	6025do			
0600	0700		Nigeria, Radio/Ibadan	6050do			
0600	0700		Nigeria, Radio/Kaduna	4770do	6090do	9570do	
0600	0700		Nigeria, Radio/Lagos	3326do	4990al		
0600	0700		Nigeria, Voice of	7255af	15150af		
0600	0700		Russia, University Network	17765as			
0600	0700		Russia, Voice of Russia	15275au	17665au	21790au	
0600	0700		Singapore, SBC Radio One	6150do			
0600	0700	vi	Solomon Islands, SIBC	5020do	9545do		
0600	0700		Swaziland, TWR	6120af	7205af	9500af	
0600	0700		Uganda, Radio	4976do	5026do	7196do	
0600	0700		UK, BBC World Service	6055af	6190af	6195eu	7160af
			11765af	11940af	11955as	15310as	15360as
			15575va	17640af	17760as	17885af	21660as
0600	0700		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb
			6350usb	6458usb	10320usb	12579usb	12689usb
0600	0700		USA, KAUJ Dallas TX	5755va			
0600	0700		USA, KIMF Otero NM	5835na			
0600	0700		USA, KTBN Salt Lk City UT	7505na			
0600	0700		USA, KWHR Naalehu HI	17780as			
0600	0700		USA, Voice of America	5995va	6035af	6105af	6080af
			7170va	7295af	11825va	11835af	11930va
			15205va			11995af	13710af
0600	0700		USA, WBCQ Kennebunk, ME	7415na			
0600	0700		USA, WEWN Birmingham AL	5825na			
0600	0700		USA, WHRA Greenbush ME	7580va			
0600	0700		USA, WHRI Noblesville IN	5745va	7315am		
0600	0700		USA, WJIE Louisville KY	7490am	13595am		
0600	0700		USA, WMLK Bethel PA	9465eu	9955eu		

0600	0700	USA, WRMI Miami FL	7385na				
0600	0700	USA, WRNO New Orleans LA	7395am				
0600	0700	USA, WSHB Cypress Creek SC	7535af				
0600	0700	USA, WTJC Newport NC	9370na				
0600	0700	USA, WWCR Nashville TN	3210na	5070na	5935na	7560na	
0600	0700	USA, WYFR Okeechobee FL	7355eu	11530eu			
0600	0700	Vanuatu, Radio	3945al	4960do			
0600	0700	Yemen, Rep of Yemen Radio	9780me				
0600	0700	Zambia, Christian Voice	9865do				
0605	0612	Croatia, Croatian Radio	9470pa				
0630	0700	Austria, Radio Austria Intl	6155eu	13730eu	17870me		
0630	0700	Georgia, Georgian Radio	11805eu				
0630	0700	Italy, IRRS	13840va				
0630	0700	Vatican City, Vatican Radio	11625af	13765af	15570af		
0637	0700	Romania, R Romania Intl	9510eu	9530na	9570eu	9625eu	
			11790eu	11829na	11940eu		

0700 UTC - 2AM E / 1AM C / 11PM P

0700	0705	New Zealand, Radio NZ Intl	15340pa				
0700	0730	Italy, IRRS	13840va				
0700	0730	mtwhf/vi	Slovakia, R Slovakia Intl	13715au	15460au	17550au	
0700	0730		UK, BBC World Service	6005af			
0700	0745		USA, WYFR Okeechobee FL	7355eu			
0700	0756		Romania, R Romania Intl	17720af	21480af		
0700	0800		Anguilla, Caribbean Beacon	6090am			
0700	0800		Australia, ABC NT Alice Springs	4810eu	9960eu		
0700	0800		Australia, ABC NT Katherine	5025do			
0700	0800		Australia, ABC NT Tennant Crk	4910do			
0700	0800		Australia, Radio	7240va	9660pa	11880va	13620as
			15320as	15420va	15415as	17580pa	17715va
							17750as
			21740va				21725va
0700	0800	vi	Botswana, Radio	3356do	4820do	7255do	
0700	0800		Canada, CFRX Toronto ON	6070do			
0700	0800		Canada, CFVP Calgary AB	6030do			
0700	0800		Canada, CKZN St John's NF	6160do			
0700	0800		Canada, CKZU Vancouver BC	6160do			
0700	0800		Costa Rica, R for Peace Intl	7455am	15040al		
0700	0800		Costa Rica, University Network	5030am	6150am	7375am	9725sa
			11870am	13750na	17645as		
0700	0800		Ecuador, HCJB	5965eu	11755pa	21455usb	
0700	0800	mtwhf	Eqt Guinea, Radio Africa	15185af			
0700	0800	as/vi	Eqt. Guinea, Radio East Africa	15185af			
0700	0800	mtwhf	France Radio France Intl	15605af			
0700	0800		Germany, Deutsche Welle	6140eu			
0700	0800	vi	Ghana, Ghana BC Corp	3366do	4915do		
0700	0800		Guyana, Voice of	3290do	5950do		
0700	0800		Kuwait, Radio	15110as			
0700	0800		Liberia, ELWA	4760do			
0700	0800		Liberia, R Liberia Intl	6100do			
0700	0800		Malaysia, Radio	7295do			
0700	0800		Malaysia, RTM Kota Kinabalu	5979do			
0700	0800		Malaysia, Voice of	6175as	9750as	15295as	
0700	0800		Myanmar, Radio	9730do			
0700	0800		Nigeria, Radio/Enugu	6025do			
0700	0800		Nigeria, Radio/Ibadan	6050do			
0700	0800		Nigeria, Radio/Kaduna	4770do	6090do	9570do	
0700	0800		Nigeria, Radio/Lagos	3326do	4990al		
0700	0800		Papua New Guinea, NBC	4890do		9675al	
0700	0800		Russia, University Network	17765as			
0700	0800		Russia, Voice of Russia	11820eu	12010eu	15275au	17665au
			21790au				
0700	0800		Singapore, SBC Radio One	6150do			
0700	0800	vi	Solomon Islands, SIBC	5020do	9545do		
0700	0800		Taiwan, R Taipei Intl	5950na			
0700	0800		UK, BBC World Service	6190af	6195eu	9410eu	11760va
			11940af	11955as	12095va	15310as	15360as
			15565va	15575va	17640me	17760as	17790as
			USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb
			6350usb	6458usb	10320usb	12579usb	12689usb
0700	0800		USA, KAUJ Dallas TX	5755va			
0700	0800		USA, KIMF Otero NM	5835na			
0700	0800		USA, KTBN Salt Lk City UT	7505na			
0700	0800		USA, KWHR Naalehu HI	11565pa	17780as		
0700	0800		USA, WBCQ Kennebunk, ME	7415na			
0700	0800		USA, WEWN Birmingham AL	5825na			
0700	0800		USA, WHRA Greenbush ME	7580va			
0700	0800		USA, WHRI Noblesville IN	5745va	7315am		
0700	0800		USA, WJIE Louisville KY	7490am	13595am		
0700	0800		USA, WMLK Bethel PA	9465eu	9955eu		
0700	0800		USA, WRNO New Orleans LA	7395am			
0700	0800	if	USA, WSHB Cypress Creek SC	7535af			
0700	0800		USA, WTJC Newport NC	9370na			
0700	0800		USA, WWCR Nashville TN	3210na	5070na	5935na	7560na
0700	0800		USA, WYFR Okeechobee FL	9985af	11580af		

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0700	0800	vi	Vanuatu, Radio	3945al	4960do				
0706	0800		New Zealand, Radio NZ Intl		11675pa				
0715	0745	mtwhf	Guam, TWR/KTWR	15215as					
0730	0745	vi/mtwhf	Vatican City, Vatican Radio	4005eu	5980eu	6185eu	7250eu		
				9645af	11740eu	15595as			
0730	0800		Australia, Radio	11695as					
0730	0800	vi	Austria, AWR	17820va					
0730	0800		Bulgaria, Radio	12000eu	13600eu				
0730	0800		Switzerland, Swiss R Intl	9885af	13790af	17665af			
0730	0800	as	UK, BBC World Service	15575va					
0738	0750		Croatia, Croatian Radio	9470pa					
0745	0800	as	Albania, TWR	12070eu					
0745	0800	mtwhf	Guam, TWR/KTWR	15215as	15330as				
0755	0800	mtwhf	Albania, TWR	12070eu					
0755	0800	mtwhf	Monaco, TWR	9870eu					

0800 UTC - 3AM E / 2AM C / 12AM P

0800	0804		Pakistan, Radio	17835eu	21465eu				
0800	0820	s	Monaco, TWR	9870eu					
0800	0827		Czech Rep, Radio Prague Intl	11600eu	15255eu				
0800	0829		Belgium, Radio Vlaanderen Intl	5985eu					
0800	0830		Australia, ABC NT Alice Springs	4810eu	9960eu				
0800	0830		Australia, ABC NT Katherine	5025do					
0800	0830		Australia, ABC NT Tennant Crk	4910do					
0800	0830		Malaysia, RTM Kota Kinabalu	5979do					
0800	0830		Malaysia, Voice of	6175as	9750as	15295as			
0800	0830		Myanmar, Radio	9730do					
0800	0845		USA, WYFR Okeechobee FL		11580af				
0800	0850	as	Albania, TWR	12070eu					
0800	0850	s	Monaco, TWR	9870eu					
0800	0900	mtwhf	Albania, TWR	12070eu					
0800	0900		Anguilla, Caribbean Beacon	6090am					
0800	0900		Australia, Radio	5995pa	7240va	9580va	9660pa	9710pa	
				11880va	12080va	15420va	15415as	17715va	17795va
				21725as	21740va				
0800	0900	vi	Austria, AWR	9660af	17820va				
0800	0900	mtwhf	Bhutan, Bhutan BC Service	5030al	6035do				
0800	0900	vi	Botswana, Radio	3356do	4820do	7255do			
0800	0900		Canada, CFRX Toronto ON	6070do					
0800	0900		Canada, CFVP Calgary AB	6030do					
0800	0900		Canada, CKZN St John's NF	6160do					
0800	0900		Canada, CKZU Vancouver BC	6160do					
0800	0900		Costa Rica, University Network	5030am	6150am	7375am	9725sa		
				11870am	13750na	17645as			
0800	0900		Ecuador, HCJB	5965eu	11755pa	21455usb			
0800	0900	mtwhf	Eqt Guinea, Radio Africa	15185af					
0800	0900	as/vi	Eqt. Guinea, Radio East Africa	15185af					
0800	0900		Germany, Deutsche Welle	6140eu					
0800	0900	vi	Ghana, Ghana BC Corp	3366do	4915do				
0800	0900	as	Guam, TWR/KTWR	15330as					
0800	0900	mtwhf	Guam, TWR/KTWR	15215as					
0800	0900		Guyana, Voice of	3290do	5950do				
0800	0900		Indonesia, Voice of	9525va	11785al	15150al			
0800	0900		Liberia, ELWA	4760do					
0800	0900		Liberia, R Liberia Intl	6100do					
0800	0900		Malaysia, Radio	7295do					
0800	0900		New Zealand, Radio NZ Intl		11675pa				
0800	0900		Nigeria, Radio/Enugu	6025do					
0800	0900		Nigeria, Radio/Ibadan	6050do					
0800	0900		Nigeria, Radio/Kaduna	4770do	6090do	9570do			
0800	0900		Nigeria, Radio/Lagos	3326do	4990al				
0800	0900		Nigeria, Voice of	7255af	15150af				
0800	0900		Papua New Guinea, NBC	4890do	9675al				
0800	0900		Russia, University Network	17765as					
0800	0900		Russia, Voice of Russia	11820eu	12010eu	17495au	17525au		
				17665au	17665au				
0800	0900		Singapore, SBC Radio One	6150do					
0800	0900	a	South Africa, Radio League	9750af	21560af				
0800	0900		South Korea, R Korea Intl	9570va	13670va				
0800	0900		UK, BBC World Service	6190af	6195eu	9410eu	11760va	11940af	
				11955as	12095va	15310as	15360as	15400af	15485va
				15575va	17640va	17760as	17830af	17790as	17885af
				21830as					
0800	0900		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb		
				6350usb	6458usb	10320usb	12579usb	12689usb	13362usb
0800	0900		USA, KALJ Dallas TX	5755va					
0800	0900		USA, KJMF Otero NM	5835na					
0800	0900		USA, KNLS Anchor Point AK	9615as					
0800	0900		USA, KTBN Salt Lk City UT	7505na					
0800	0900		USA, KWHR Naalehu HI	11565pa					
0800	0900		USA, Voice of America	11955va	15150va				
0800	0900		USA, WBCQ Kennebunk, ME	7415na					
0800	0900		USA, WEWN Birmingham AL	5825na					
0800	0900		USA, WHRI Noblesville IN	5745va	7315am				

0800	0900		USA, WJIE Louisville KY	7490am	13595am				
0800	0900		USA, WMLK Bethel PA	9465eu	9955eu				
0800	0900		USA, WRMI Miami FL	7385na					
0800	0900		USA, WRNO New Orleans LA	7395am					
0800	0900	as	USA, WSHB Cypress Creek SC	7535eu	9845	cc			
0800	0900	tw	USA, WSHB Cypress Creek SC	9845	cc				
0800	0900		USA, WTJC Newport NC	9370na					
0800	0900		USA, WWCN Nashville TN	3210na	5070na	5935na	7560na		
0800	0900	vi	Vanuatu, Radio	3945al	4960do				
0805	0812		Croatia, Croatian Radio	13820au					
0830	0900		Australia, ABC NT Alice Springs	2310do	4835irr				
0830	0900		Australia, ABC NT Katherine	2485do					
0830	0900		Australia, ABC NT Tennant Crk	2325do					
0830	0900		Georgia, Georgian Radio	11910eu					
0830	0900	vi	Solomon Islands, SIBC	5020do	9545do				
0830	0900		Switzerland, Swiss R Intl	21770af					
0840	0850		Turkmenistan, Turkmen Radio	4930as					

0900 UTC - 4AM E / 3AM C / 1AM P

0900	0915	mtwhf/vl	Solomon Islands, SIBC	5020do	9545do				
0900	0920	mtwhf s	Albania, TWR	12070eu					
0900	0920	mtwhf	Monaco, TWR	9870eu					
0900	0930		Austria, AWR	17670af					
0900	0930		Guam, TWR/KTWR	15330as					
0900	0930		Liberia, ELWA	4760do					
0900	0945		Germany, Deutsche Welle	11785af	15410af	17800af	17820va	17845va	9510va 9770as 21560af
0900	0956		China, China Radio Intl	11730pa	15210pa				
0900	1000		Anguilla, Caribbean Beacon	6090am					
0900	1000		Australia, ABC NT Alice Springs	2310do	4835irr				
0900	1000		Australia, ABC NT Katherine	2485do					
0900	1000		Australia, ABC NT Tennant Crk	2325do					
0900	1000		Australia, Radio	17775as					
0900	1000		Australia, Radio	7240va	9580va	9660pa	11880va	12080va	
			15240as 15415as 17715va	17750as	17795va	21725as	21740va		
			21820as						
0900	1000		Australia, Voice International	13685as					
0900	1000	vl	Botswana, Radio	3356do	4820do	7255do			
0900	1000		Canada, CFRX Toronto ON	6070do					
0900	1000		Canada, CFVP Calgary AB	6030do					
0900	1000		Canada, CKZN St John's NF	6160do					
0900	1000		Canada, CKZU Vancouver BC	6160do					
0900	1000		Costa Rica, University Network	5030am	6150am	7375am	9725sa		
			11870am 13750na 17645as						
			11755pa	21455usb					
0900	1000		Ecuador, HCJB	5965eu	11675pa				
0900	1000	mtwhf	Eqt Guinea, Radio Africa	15185af					
0900	1000	as/vl	Eqt. Guinea, Radio East Africa	15185af					
0900	1000		Germany, Deutsche Welle	6140eu					
0900	1000	vl	Ghana, Ghana BC Corp	4915do					
0900	1000		Guyana, Voice of	3290do	5950do				
0900	1000	as/vl	Italy, IRRS	13840va					
0900	1000		Liberia, R Liberia Intl	6100do					
0900	1000		Malaysia, Radio	7295do					
0900	1000	vl/s	Malta, VO Mediterranean	9630eu					
0900	1000		New Zealand, Radio NZ Intl	11675pa					
0900	1000		Nigeria, Radio/Enugu	6025do					
0900	1000		Nigeria, Radio/Ibadan	6050do					
0900	1000		Nigeria, Radio/Kaduna	4770do	6090do	9570do			
0900	1000		Nigeria, Radio/Lagos	3326do	4990al				
0900	1000		Nigeria, Voice of	7255af	15150af				
0900	1000		Palau, KHBN/VO Hope	15725as					
0900	1000		Papua New Guinea, NBC	4890do	9675al				
0900	1000		Russia, University Network	17765as					
0900	1000		Russia, Voice of Russia	11820eu	15275au	17495au	17525au		
			17665au						
0900	1000		Singapore, SBC Radio One	6150do					
0900	1000	as/vl	Solomon Islands, SIBC	5020do	9545do				
0900	1000		UK, BBC World Service	6190af	6195va	9605as	9740as	11760va	
			11940af 12095eu	15190as	15310as	15360as	15400af	15485va	
			15565va 15575va	17640va	17760as	17830af	17790as	17885af	
			21470af 21660as						
0900	1000		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb		
			6350usb 6458usb	10320usb	12579usb	12689usb	13362usb		
0900	1000		USA, KALJ Dallas TX	5755va					
0900	1000		USA, KJMF Otero NM	5835na					
0900	1000		USA, KTBN Salt Lk City UT	7505na					
0900	1000		USA, KWHR Naalehu HI	11565pa					
0900	1000		USA, Voice of America	11955va	13610va	15150va			
0900	1000		USA, WBCQ Kennebunk, ME	7415na					
0900	1000		USA, WEWN Birmingham AL	5825na					
0900	1000		USA, WHRA Greenbush ME	7580va					
0900	1000		USA, WHRI Noblesville IN	5745va	7315am				
0900	1000		USA, WJIE Louisville KY	7490am	13595am				

Shortwave Guide



0900	1000		USA, WRMI Miami FL	7385na				
0900	1000	th	USA, WSHB Cypress Creek SC		7535eu			
0900	1000		USA, WTJC Newport NC	9370na				
0900	1000		USA, WWCR Nashville TN	3210na	5070na	5935na	7560na	
0900	1000	vi	Vanuatu, Radio	3945al	4960do			
0910	0930	s	Armenia, Voice of	4810eu	15270as			
0930	1000		Georgia, Georgian Radio		11910me			
0930	1000		Lithuania, R Vilnius	9710eu				
0930	1000		Netherlands, Radio	9790va	12065va	13710as		
0938	0950		Croatia, Croatian Radio	13820au				
0945	1000	mtwhf/vl	Solomon Islands, SIBC	5020do	9545do			

1000 UTC - 5AM E / 4AM C / 2AM P

1000	1027		Vietnam, Voice of	9840as	12020au			
1000	1029		Czech Rep, Radio Prague Intl		21745va			
1000	1030		Guam, AWR/KSDA	11705as	11900as			
1000	1030		Mongolia, Voice of	12085as				
1000	1030		Sri Lanka, SLBC	4940as				
1000	1030		UK, BBC World Service	9605as	15360as	21660as		
1000	1030		UK, RTE Radio		15280au			
1000	1045		USA, KWHR Naalehu HI	11565pa				
1000	1056		China, China Radio Intl	11730pa	15210pa			
1000	1056		North Korea, Voice of	3560as	9335am	9849as	11710am	11735as
1000	1100		Anguilla, Caribbean Beacon		6090am			
1000	1100		Australia, ABC NT Alice Springs		2310do	4835irr		
1000	1100		Australia, ABC NT Katherine		2485do			
1000	1100		Australia, ABC NT Tennant Crk		2325do			
1000	1100		Australia, Radio	9580va	9660pa	11880as	15240as	15415as
1000	1100		17580pa	17750as	17795va	21725va	21820as	
1000	1100		Australia, Voice International		13685as			
1000	1100	as	Bhutan, Bhutan BC Service		5030al	6035do		
1000	1100	vi	Botswana, Radio	4820do	7255do	9595do		
1000	1100		Canada, CFRX Toronto ON		6070do			
1000	1100		Canada, CFVP Calgary AB		6030do			
1000	1100		Canada, CKZN St John's NF		6160do			
1000	1100		Canada, CKZU Vancouver BC		6160do			
1000	1100		Costa Rica, University Network		5030am	6150am	7375am	9725sa
1000	1100		11870am	13750na	17645as			
1000	1100		Ecuador, HCJB	11755pa	21455usb			
1000	1100	mtwhf	Eqt Guinea, Radio Africa		15185af			
1000	1100	as/vl	Eqt. Guinea, Radio East Africa		15185af			
1000	1100		Germany, Deutsche Welle		6140eu			
1000	1100	vi	Ghana, Ghana BC Corp		4915do			
1000	1100		Guyana, Voice of	3290do	5950do			
1000	1100		India, All India Radio	13710as	15020as	15235as	15260as	
1000	1100		17510au	17800as	17895au			
1000	1100	as/vl	Italy, IRRS	13840va				
1000	1100		Japan, Radio	9695as	15590as	21755	ac	
1000	1100		Liberia, R Liberia Intl		6100do			
1000	1100		Malaysia, Radio	7295do				
1000	1100		Netherlands, Radio	9790va	12065va	13710as		
1000	1100		New Zealand, Radio NZ Intl		11675pa			
1000	1100		Nigeria, Radio/Enugu	6025do				
1000	1100		Nigeria, Radio/Ibadan	6050do				
1000	1100		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
1000	1100		Nigeria, Radio/Lagos	3326do	4990al			
1000	1100		Nigeria, Voice of	7255af				
1000	1100		Palau, KHBH/VO Hope	15725as				
1000	1100		Papua New Guinea, NBC	4890do	9675al			
1000	1100		Russia, University Network		17765as			
1000	1100		Singapore, SBC Radio One		6150do			
1000	1100	vi	Solomon Islands, SIBC	5020do	9545do			
1000	1100		South Africa, Radio Veritas		7240af			
1000	1100		UK, BBC World Service	6190af	6195va	9740as	11760va	11940af
1000	1100		12095eu	15190as	15310as	15485va	15575va	17640va
1000	1100		17760as	17790as	17885af	21470af		
1000	1100	as	UK, BBC World Service	15400af	17830af			
1000	1100		USA, Armed Forces Network		3903usb	4278usb	4319usb	4993usb
1000	1100		6350usb	6458usb	10320usb	12579usb	12689usb	13362usb
1000	1100		USA, KAUJ Dallas TX	5755va				
1000	1100		USA, KIMF Otero NM	5835na				
1000	1100		USA, KTBH Salt Lk City UT		7505na			
1000	1100		USA, KWHR Naalehu HI	9930as				
1000	1100		USA, Voice of America	5745am	5985va	7370am	9590am	11720va
1000	1100		15250va	15425va	15455va			
1000	1100		USA, WBCQ Kennebunk, ME		7415na			
1000	1100		USA, WEWN Birmingham AL		5825na	15745na		
1000	1100		USA, WHRI Noblesville IN		9495va	9840am		
1000	1100		USA, WJIE Louisville KY	7490am	13595am			
1000	1100		USA, WRMI Miami FL	9955am				
1000	1100		USA, WRNO New Orleans LA		7395am			
1000	1100	mwth	USA, WSHB Cypress Creek SC		6095am	11780am		
1000	1100	tfa	USA, WSHB Cypress Creek SC		11780as			
1000	1100		USA, WTJC Newport NC	9370na				

1000	1100		USA, WWCR Nashville TN	5070na	5935na	7560na	9475na	
1000	1100		USA, WYFR Okeechobee FL	5950na				
1000	1100		Vatican City, Vatican Radio	5890eu				
1000	1200	s	USA, WSHB Cypress Creek SC	9455am	11780as			
1030	1045	mtwhf	Ethiopia, Radio	5990do	7110do	9704do		
1030	1100		Guam, AWR/KSDA	11900as				
1030	1100		Iran, VOIRI	15215as	15375as	15480as	21470as	21730as
1030	1100		Netherlands, Radio	5965na	6045eu	9860eu		
1030	1100		Sri Lanka, SLBC	4940as	11835as	15120as	17850as	
1030	1100		UAE, Emirates Radio	13675eu	15370eu	15395eu	21605eu	

1100 UTC - 6AM E / 5AM C / 3AM P

1100	1104		Pakistan, Radio	17835eu	21465eu			
1100	1105		New Zealand, Radio NZ Intl		11675pa			
1100	1120	fa	Kazakhstan, R Almaty	9620eu	11840eu			
1100	1127		Iran, VOIRI	15215as	15375as	15480as	21470as	21730as
1100	1127		Vietnam, Voice of		7285as			
1100	1130	as	Bhutan, Bhutan BC Service		5030al	6035do		
1100	1130		Netherlands, Radio	9790va	12065va	13710as		
1100	1130		UK, BBC World Service	15400af	17790sa			
1100	1145		Germany, Deutsche Welle		15410af	17800af	21530af	21780af
1100	1200		Anguilla, Caribbean Beacon		11775am			
1100	1200		Australia, ABC NT Alice Springs		2310do	4835irr		
1100	1200		Australia, ABC NT Katherine		2485do			
1100	1200		Australia, ABC NT Tennant Crk		2325do			
1100	1200		Australia, Radio	5995pa	6020pa	9475as	9580va	9660pa
1100	1200		11650va	11880as	12080va	15240va	15415as	17580pa
1100	1200		17795va	21725va	21820as			
1100	1200		Australia, Voice International		13685as			
1100	1200		Canada, CFRX Toronto ON		6070do			
1100	1200		Canada, CFVP Calgary AB		6030do			
1100	1200		Canada, CKZN St John's NF		6160do			
1100	1200		Canada, CKZU Vancouver BC		6160do			
1100	1200		Costa Rica, University Network		5030am	6150am	7375am	9725sa
1100	1200		11870am	13750na	17645as			
1100	1200		Ecuador, HCJB		12005am	15115am	21455usb	
1100	1200	mtwhf	Eqt Guinea, Radio Africa		15185af			
1100	1200	as/vl	Eqt. Guinea, Radio East Africa		15185af			
1100	1200		Germany, Deutsche Welle		6140eu			
1100	1200	vi	Ghana, Ghana BC Corp		4915do			
1100	1200	as/vl	Italy, IRRS	13840va				
1100	1200		Japan, Radio		6120na	9695as	15590as	
1100	1200		Jordan, Radio		11690eu			
1100	1200		Malaysia, Radio		7295do			
1100	1200		Netherlands, Radio		5965na	6045eu	9860eu	
1100	1200		Papua New Guinea, NBC		4890do	9675al		
1100	1200		Russia, University Network		17765as			
1100	1200		Singapore, R Singapore Intl		6150as	9600as		
1100	1200		Taiwan, R Taipei Intl		7445as	11985as		
1100	1200		UK, BBC World Service	6190af	6195va	9740as	11760va	11940af
1100	1200		12095eu	15190va	15310as	15485va	15575va	17640va
1100	1200		17760as	17790as	17830af	17885af	21470af	
1100	1200		USA, Armed Forces Network		3903usb	4278usb	4319usb	4993usb
1100	1200		6350usb	6458usb	10320usb	12579usb	12689usb	13362usb
1100	1200		USA, KAUJ Dallas TX	5755va				
1100	1200		USA, KIMF Otero NM	5835na				
1100	1200		USA, KTBH Salt Lk City UT		7505na			
1100	1200		USA, KWHR Naalehu HI	9930as				
1100	1200		USA, Voice of America	5985va	6110va	9760va	11705va	11720va
1100	1200		15250va	15425va	15455va			
1100	1200		USA, WEWN Birmingham AL		5825na	15745na		
1100	1200		USA, WHRI Noblesville IN		9495va	9840am		
1100	1200		USA, WINB Red Lion PA	13570am				
1100	1200		USA, WJIE Louisville KY	7490am	13595am			
1100	1200		USA, WRMI Miami FL	9955am				
1100	1200		USA, WRNO New Orleans LA		7395am			
1100	1200	tfas	USA, WSHB Cypress Creek SC		6095am			
1100	1200		USA, WTJC Newport NC	9370na				
1100	1200		USA, WWCR Nashville TN	5070na	5935na	7560na		
1100	1200		15825na					
1100	1200		USA, WYFR Okeechobee FL		5950na	11725sa	11830sa	
1106	1200		New Zealand, Radio NZ Intl		15175pa			
1115	1130		Israel, Kol Israel		15640va	17545va		
1115	1145		Nepal, Radio		3230as	5005as	6100as	7164as
1120	1140	w	Kazakhstan, R Almaty	9620eu	11840eu			
1130	1145	vi	Libya, Voice of Africa	15435irr	21695irr			
1130	1155		Belgium, Radio Vlaanderen Intl		7390as			
1130	1157		Czech Rep, Radio Prague Intl		11640va	21745va		
1130	1200		South Korea, R Korea Intl		9650na			
1130	1200		Sri Lanka, SLBC		4940as			
1130	1200	a	UK, Wales Radio Intl	17625au				
1130	1200	f	Vatican City, Vatican Radio	5595va	17515va			

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1140	1200	†	Kazakhstan, R Almaty	9620eu	11840eu				
1200 UTC - 7AM E / 6AM C / 4AM P									
1200	1225		Netherlands, Radio	5965na	6045eu	9860eu			
1200	1230		France Radio France Intl	15540af	25820af				
1200	1230		Uzbekistan, Radio Tashkent		5060as	5975as	6025as	9715as	
1200	1245		USA, WYFR Okeechobee FL		5950na				
1200	1256		China, China Radio Intl	9730as	9760pa	11760pa	11855as	11980as	
			15415pa						
1200	1259		Canada, Radio Canada Intl		9660as	11730as			
1200	1300		Anguilla, Caribbean Beacon		11775am				
1200	1300		Australia, ABC NT Katherine		2485do				
1200	1300		Australia, ABC NT Tennant Crk		2325do				
1200	1300		Australia, Radio	5995pa	6020pa	9475as	9580va	9660pa	
			11650va	11880as	12080va	15415as	15240pa	17580pa	21725va
			21820as						
1200	1300		Australia, Voice International		13685as				
1200	1300		Canada, CBC Northern Service		9625do				
1200	1300		Canada, CFRX Toronto ON		6070do				
1200	1300		Canada, CFVP Calgary AB		6030do				
1200	1300		Canada, CKZN St John's NF		6160do				
1200	1300		Canada, CKZU Vancouver BC		6160do				
1200	1300		China, Voice of Hope	7485as					
1200	1300		Costa Rica, University Network		5030am	6150am	7375am	9725sa	
			11870am	13750na	17645as				
1200	1300		Ecuador, HCJB		12005am	15115am	21455usb		
1200	1300		Germany, Deutsche Welle		6140eu				
1200	1300		Germany, Overcomer Ministries		5975eu				
1200	1300	as/vl	Italy, IRRS	13840va					
1200	1300		Jordan, Radio		11690eu				
1200	1300		Malaysia, Radio		7295do				
1200	1300		New Zealand, Radio NZ Intl		15175pa				
1200	1300		Papua New Guinea, NBC		4890do	9675al			
1200	1300		Russia, University Network		17765as				
1200	1300		Russia, Voice of Hope	13590as					
1200	1300		Singapore, R Singapore Intl		6150as	9600as			
1200	1300		Taiwan, R Taipei Intl	7130as	9610au				
1200	1300		UK, BBC World Service	6190af	6195va	9740as	11760va	11940af	
			12095eu	15190va	15310as	15485va	15565va	15575va	17640va
			17760as	17790as	17885af	17830af	21470af		
1200	1300		Ukraine, R Ukraine Intl	11825na	11840na	13590na	17760na		
1200	1300		USA, Armed Forces Network		3903usb	4278usb	4319usb	4993usb	
			6350usb	6458usb	10320usb	12579usb	12689usb	13362usb	
1200	1300		USA, KALJ Dallas TX		5755va				
1200	1300		USA, KIMF Otero NM		5835na				
1200	1300		USA, KTBN Salt Lk City UT		7505na				
1200	1300		USA, KWHR Naalehu HI	9930as	11565pa	9760va	11705va	11715va	
1200	1300		USA, Voice of America	6110va	9645va				
			15250va	15425va	15455va				
1200	1300		USA, WEWN Birmingham AL		5825na	15745na			
1200	1300		USA, WHRI Noblesville IN		9495na	9840am			
1200	1300		USA, WINB Red Lion PA	13570am					
1200	1300		USA, WJIE Louisville KY	7490am	13595am				
1200	1300		USA, WRMI Miami FL	9955am					
1200	1300		USA, WRNO New Orleans LA		7395am				
1200	1300	mwh	USA, WSHB Cypress Creek SC		6095am	9880as			
1200	1300	a	USA, WSHB Cypress Creek SC		9455am	9880as			
1200	1300	tfs	USA, WSHB Cypress Creek SC		9880as				
1200	1300		USA, WTJC Newport NC	9370na					
1200	1300		USA, WWCR Nashville TN		5070na	5935na	7560na		
			15825na						
1200	1300		USA, WYFR Okeechobee FL		11970na	13695na			
1215	1300		Egypt, Radio Cairo	17775as					
1230	1257		Vietnam, Voice of	9840as	12020as				
1230	1300		Australia, Radio	17750as					
1230	1300		Austria, Radio Austria Intl		6155eu	13730eu			
1230	1300		Bangladesh, Bangla Betar		7185as	9550as			
1230	1300		Bulgaria, Radio	12000eu	15700eu				
1230	1300		Sri Lanka, SLBC	4940as	6005as	6075as	9770as	15745as	
1230	1300		Sweden, Radio	17505va	18960na				
1230	1300		Thailand, Radio	9810va					
1230	1300		UAE, Gospel For Asia	15170as					
1245	1300	hfa	Seychelles, FEBA Radio	15535me					
1300	1305		New Zealand, Radio NZ Intl		15175pa				
1300	1310	mtwhfa	Turkmenistan, Turkmen Radio		5015as				
1300	1330		Australia, Radio	11880as					
1300	1330		Egypt, Radio Cairo	17775as					
1300	1330		UAE, AWR	17870as					
1300	1330		UAE, Gospel For Asia	15170as					
1300	1345		USA, WYFR Okeechobee FL		11970na				
1300	1356		China, China Radio Intl	9570na	11760pa	11900pa	11980as	15180as	
1300	1356		North Korea, Voice of	4405as	7505eu	9335na	11335eu		
			11710am	13760eu					

1300	1400		Anguilla, Caribbean Beacon		11775am				
1300	1400		Australia, Radio	5995pa	6020pa	9580va	9660pa	11650va	
			12080va	15240pa	15415as	17580pa	21725va	21820as	
1300	1400		Australia, Voice International		13690as				
1300	1400		Canada, CBC Northern Service		9625do				
1300	1400		Canada, CFRX Toronto ON		6070do				
1300	1400		Canada, CFVP Calgary AB		6030do				
1300	1400		Canada, CKZN St John's NF		6160do				
1300	1400		Canada, CKZU Vancouver BC		6160do				
1300	1400	mtwhf	Canada, Radio Canada Intl		9515am	13655am	17710am		
1300	1400		China, Voice of Hope	7485as					
1300	1400		Costa Rica, University Network		5030am	6150am	7375am	9725sa	
			11870am	13750na	17645as				
1300	1400		Ecuador, HCJB		12005am	15115am	21455usb		
1300	1400		Germany, Deutsche Welle		6140eu				
1300	1400		Germany, Overcomer Ministries		13810me				
1300	1400		Italy, IRRS	13840va					
1300	1400		Jordan, Radio		11690eu				
1300	1400		Malaysia, Radio		7295do				
1300	1400		Papua New Guinea, NBC		4890do	9675al			
1300	1400		Poland, Radio Polonia	6095eu	9525eu				
1300	1400		Russia, University Network		17765as				
1300	1400		Singapore, R Singapore Intl		6150as	9600as			
1300	1400	as	South Africa, Channel Africa		11720af	17725af	21760af		
1300	1400		South Korea, R Korea Intl		9570as	13670as			
1300	1400		UK, BBC World Service	6190af	6195va	9740as	11760va	11940af	
			12095eu	15190va	15310as	15420af	15485va	15565va	15575va
			17640va	17760as	17790as	17830af	17885af	21470af	
1300	1400		USA, Armed Forces Network		3903usb	4278usb	4319usb	4993usb	
			6350usb	6458usb	10320usb	12579usb	12689usb	13362usb	
1300	1400		USA, KALJ Dallas TX		5755va				
1300	1400		USA, KIMF Otero NM		5835na				
1300	1400		USA, KNLS Anchor Point AK		9615as				
1300	1400		USA, KTBN Salt Lk City UT		7505na				
1300	1400		USA, KWHR Naalehu HI	9930as	11565pa	9760va	11705va	15425va	
1300	1400		USA, Voice of America	6160va	9645va				
			15480va						
1300	1400		USA, WBCQ Kennebunk, ME		7415na				
1300	1400	mtwhf	USA, WBCQ Kennebunk, ME		17494na				
1300	1400		USA, WEWN Birmingham AL		9955na	15745na			
1300	1400		USA, WHRA Greenbush ME		17560va				
1300	1400		USA, WHRI Noblesville IN		9840am	15105va			
1300	1400		USA, WINB Red Lion PA	13570am					
1300	1400		USA, WJIE Louisville KY	7490am	13595am				
1300	1400		USA, WRMI Miami FL	15725na					
1300	1400		USA, WRNO New Orleans LA		7395am				
1300	1400	mtwhas	USA, WSHB Cypress Creek SC		9430na	7460as			
1300	1400	tf	USA, WSHB Cypress Creek SC		9455am	7460as			
1300	1400	as	USA, WSHB Cypress Creek SC		7460as				
1300	1400		USA, WTJC Newport NC	9370na					
1300	1400		USA, WWCR Nashville TN		5935na	7560na	12160na		
			15685na						
1300	1400		USA, WYFR Okeechobee FL		11740na	11830na	11560as	17510sa	
			17675na						
1306	1400	occasional	New Zealand, Radio NZ Intl		6095pa				
1330	1350		UAE, Emirates Radio	13630eu	13675eu	15400eu	21597eu		
1330	1357		Vietnam, Voice of	7145eu	9730eu				
1330	1400		Australia, Radio	11660as	17750as				
1330	1400		Austria, Radio Austria Intl		17855au				
1330	1400	mtwhf	Bosnia/Serbia, R. Yugoslavia		11835au				
1330	1400		Germany, Voice of Hope	15775as					
1330	1400		Guam, AWR/KSDA	11755as	15660as				
1330	1400		India, All India Radio	9690as	11620as	13710as			
1330	1400		Laos, Lao National Radio		7145as				
1330	1400		Sweden, Radio	9430va	18960na				
1330	1400		Turkey, Voice of	17690va	17815eu				
1330	1400		UAE, AWR	15385as					
1330	1400		Uzbekistan, Radio Tashkent		5060as	5975as	6025as	9715as	

1400 UTC - 9AM E / 8AM C / 6AM P

1400	1420		Turkey, Voice of	17690va	17815va				
1400	1429		Czech Rep, Radio Prague Intl		21745va				
1400	1430		Ecuador, HCJB	12005am	15115am	21455usb			
1400	1430		Germany, Voice of Hope	15775as					
1400	1430		Thailand, Radio	9530va					
1400	1455	as	South Africa, Channel Africa		11720af	17725af	21760af		
1400	1456		China, China Radio Intl	7405na	9700as	11675pa	11765as	13685af	
			15125af	17720na					
1400	1456		Romania, R Romania Intl		15365eu	17790eu			
1400	1500		Anguilla, Caribbean Beacon		11775am				
1400	1500		Australia, Radio	9580va	9660pa	11650va	11660as	12080va	
			15240pa	15415as	15515va	17580pa	17750as	21725va	
1400	1500		Australia, Voice International		13690as				

Shortwave Guide



1400	1500		Canada, CBC Northern Service	9625do			
1400	1500		Canada, CFRX Toronto ON	6070do			
1400	1500		Canada, CFVP Calgary AB	6030do			
1400	1500		Canada, CKZN St John's NF	6160do			
1400	1500		Canada, CKZU Vancouver BC	6160do			
1400	1500	mtwhf	Canada, Radio Canada Intl	9515am	13655am	17710am	
1400	1500		Costa Rica, University Network	5030am	6150am	7375am	9725sa
			11870am 13750na 17645as				
1400	1500		France Radio France Intl 7175af	9580af	17620af		
1400	1500		Germany, Deutsche Welle	6140eu			
1400	1500		Germany, Overcomer Ministries	13810me			
1400	1500		India, All India Radio	9690as	11620as	13710as	
1400	1500		Japan, Radio	7200as	9505na	9845as	11730as
1400	1500		Jordan, Radio	11690eu			
1400	1500	occasional	New Zealand, Radio NZ Intl	6095pa			
1400	1500		Oman, Radio	15140eu			
1400	1500		Papua New Guinea, NBC	4890do	9675al		
1400	1500		Russia, University Network	17765as			
1400	1500		Singapore, SBC Radio One	6150do			
1400	1500		Taiwan, R Taipei Intl	15265as			
1400	1500		UAE, AWR	15385as			
1400	1500		UK, BBC World Service	6190af	6195va	9740as	11940af 12095va
			15190am 15310as 15485va	15565va	15575va	17640va	17830af
			21470af 21660af				
1400	1500		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb
			6350usb 6458usb 10320usb	12579usb	12689usb	13362usb	
			USA, KALJ Dallas TX	13815va			
			USA, KIMF Otero NM	5835na			
			USA, KJES Vado NM	11715na			
1400	1500		USA, KTBN Salt Lk City UT	7505na			
1400	1500		USA, KWHR Naalehu HI	9930as			
1400	1500		USA, Voice of America	6110va	7125va	9645va	9760va 11705va
			15205va 15395va 15425va	15480va			
1400	1500		USA, WBCC Kennebunk, ME	17495na			
1400	1500		USA, WEWN Birmingham AL	9955na	15745na		
1400	1500		USA, WHRA Greenbush ME	17560va			
1400	1500		USA, WHRI Noblesville IN	9840am	15105va		
1400	1500		USA, WINB Red Lion PA	13570am			
1400	1500		USA, WJIE Louisville KY	7490am	13595am		
1400	1500		USA, WRMI Miami FL	15725na			
1400	1500		USA, WRNO New Orleans LA	7395am			
1400	1500		USA, WTJC Newport NC	9370na			
1400	1500		USA, WWCR Nashville TN	9475na	12160na	13845na	
			15685na				
1400	1500		USA, WYFR Okeechobee FL	11740na	11830na	11560as	17510sa
			17675na 17760na				
1415	1420		Nepal, Radio	3230as	5005as	6100as	7164as
1430	1450	vl	Vatican City, Vatican Radio	9865as	13765as	15235as	
1430	1500		Australia, Radio	9475as			
1430	1500		Austria, Radio Austria Intl	6155eu	13730eu		
1430	1500		Myanmar, Radio	5040do	5985do		
1430	1500		Netherlands, Radio	9890as	11835as	12075as	15220na
1430	1500		Sweden, Radio	17505va	18960na		
1445	1500		Guam, TWR/KTWR	15330as			

1500 UTC - 10AM E / 9AM C / 7AM P

1500	1515	whf	Seychelles, FEBA Radio	15445as			
1500	1530		Mexico, Radio Mexico Intl	9705am	11770am		
1500	1530		Mongolia, Voice of	12015eu			
1500	1530		South Africa, Channel Africa	17725af			
1500	1530	as	UK, BBC World Service	11860af	21490af		
1500	1545		Guam, TWR/KTWR	15330as			
1500	1556		China, China Radio Intl	7405as	7160as	9785as	13685af
			15125na 17720na				
1500	1556		North Korea, Voice of	4405as	7505eu	9335am	11335eu
			11710am				
1500	1557	mtwhf	Canada, Radio Canada Intl	15360as	17870as		
1500	1559		Canada, Radio Canada Intl	9515am	13655am	17710am	
1500	1600		Anguilla, Caribbean Beacon	11775am			
1500	1600		Australia, Radio	9475as	9580va	9660pa	11650va 11660as
			12080va 15240pa 15415as	15515va	17580pa	17750as	21725va
1500	1600		Australia, Voice International	13690as			
1500	1600		Austria, Radio Afrika Intl	17895eu			
1500	1600		Canada, CBC Northern Service	9625do			
1500	1600		Canada, CFRX Toronto ON	6070do			
1500	1600		Canada, CFVP Calgary AB	6030do			
1500	1600		Canada, CKZN St John's NF	6160do			
1500	1600		Canada, CKZU Vancouver BC	6160do			
1500	1600		Costa Rica, University Network	5030am	6150am	7375am	9725sa
			11870am 13750na 17645as				
1500	1600		Germany, Deutsche Welle	6140eu			
1500	1600	a	Germany, Overcomer Ministries	6110eu			
1500	1600		Japan, Radio	7200as	9750as	9845as	11730as
1500	1600		Jordan, Radio	11690na			

1500	1600		Myanmar, Radio	5040do	5985do		
1500	1600		Netherlands, Radio	9890as	11835as	12075as	15220na
1500	1600	occasional	New Zealand, Radio NZ Intl	6095pa			
1500	1600		Papua New Guinea, NBC	4890do	9675al		
1500	1600		Russia, Voice of Russia	6205as	7315as	7350as	9590as 9875as
			11500as				
1500	1600		Singapore, SBC Radio One	6150do			
1500	1600		UK, BBC World Service	5975as	6190af	6195va	9410va 9740as
			11940af 12095va 15190am	15310as	15400af	15485va	15565va
			17640me 17790as 17830af	21470af	21660af		
1500	1600		USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb
			6350usb 6458usb 10320usb	12579usb	12689usb	13362usb	
1500	1600		USA, KALJ Dallas TX	13815va			
1500	1600		USA, KIMF Otero NM	5835na			
1500	1600		USA, KJES Vado NM	11715na			
1500	1600		USA, KTBN Salt Lk City UT	7505na			
1500	1600		USA, KWHR Naalehu HI	9930as			
1500	1600		USA, Voice of America	7125va	9645va	15205va	15395va
1500	1600		USA, WBCC Kennebunk, ME	17495na			
1500	1600		USA, WEWN Birmingham AL	9955na	15745na		
1500	1600		USA, WHRA Greenbush ME	17650va			
1500	1600		USA, WHRI Noblesville IN	9840am	15105va		
1500	1600		USA, WINB Red Lion PA	13570am			
1500	1600		USA, WJIE Louisville KY	7490am	13595am		
1500	1600		USA, WRMI Miami FL	15725na			
1500	1600		USA, WRNO New Orleans LA	7395am			
1500	1600		USA, WTJC Newport NC	9370na			
1500	1600		USA, WWCR Nashville TN	9475na	12160na	13845na	
			15685na				
1500	1600		USA, WYFR Okeechobee FL	6280as	11830na	17760na	
1515	1530	mtwhf	Seychelles, FEBA Radio	11600as			
1530	1545		Bangladesh, Bangla Betar	4882as	15520as		
1530	1545		Seychelles, FEBA Radio	11600as			
1530	1550	as	Vatican City, Vatican Radio	9865va	13765af	15235af	
1530	1600		Germany, Voice of Hope	9860me			
1530	1600		Iran, VOIRI	7115as	7195eu	9610as	11640as 11775as 11835as
1530	1600		USA, Voice of America	6110va	9760va	9795va	11995va 15460va
1540	1550		Turkmenistan, Turkmen Radio	4930as			
1545	1600	s h	Bangladesh, Bangla Betar	4882as	15520as		
1545	1600	smt hfa	Seychelles, FEBA Radio	11600as			

1600 UTC - 11AM E / 10AM C / 8AM P

1600	1615		Germany, Voice of Hope	9860me			
1600	1615		Pakistan, Radio	11570me	15070me	15530af	17725af
1600	1625		Netherlands, Radio	9890as	11835as	12075as	15220na
1600	1627		Vietnam, Voice of	7145eu	9730eu		
1600	1630		Australia, Voice International	13690as			
1600	1630		Guam, AWR/KSDA	11560as	15495as	17630as	
1600	1630		Mexico, Radio Mexico Intl	9705am	11770am		
1600	1630		South Africa, Channel Africa	9525af			
1600	1630		UAE, Gospel For Asia	9785as			
1600	1630		USA, KWHR Naalehu HI	9930as			
1600	1635		UAE, Emirates Radio	13630eu	13675eu	15400eu	21597eu
1600	1645		Germany, Deutsche Welle	11695am	13605as	15455af	21840af
1600	1645		USA, WYFR Okeechobee FL	17790na			
1600	1650	occasional	New Zealand, Radio NZ Intl	6095pa			
1600	1656		China, China Radio Intl	7190af	13650af		
1600	1656		North Korea, Voice of	3560as	9975af	11735af	
1600	1659	as	Canada, Radio Canada Intl	9515am	13655am	17710am	
1600	1700		Algeria, Radio Algiers Intl	11715eu	15160eu		
1600	1700		Anguilla, Caribbean Beacon	11775am			
1600	1700		Australia, Radio	9475as	9580va	9660pa	11650va 11660as
			11880as 12080va 15240pa	15415as	15515va	17580pa	21725va
1600	1700		Canada, CBC Northern Service	9625do			
1600	1700		Canada, CFRX Toronto ON	6070do			
1600	1700		Canada, CFVP Calgary AB	6030do			
1600	1700		Canada, CKZN St John's NF	6160do			
1600	1700		Canada, CKZU Vancouver BC	6160do			
1600	1700		Costa Rica, University Network	5030am	6150am	7375am	9725sa
			11870am 13750na				
1600	1700		Ethiopia, Radio	5990do	7110af	7165af	9560af 9704af
			11800af				
1600	1700		France Radio France Intl	11615af	11995af	12015af	15605af 17850af
1600	1700		Germany, Deutsche Welle	6140eu	6170as	7225as	9735af
1600	1700	a	Germany, Overcomer Ministries	6015eu			
1600	1700		Jordan, Radio	11690na			
1600	1700		Russia, Voice of Russia	4940as	4965as	4975as	6005me 7305as
			9590as 9830me				
1600	1700		South Africa, Radio Veritas	3230af			
1600	1700		South Korea, R Korea Intl	5975va	9515va	9870va	
1600	1700		Sri Lanka, SLBC	4940as			
1600	1700		Taiwan, R Taipei Intl	11550as			
1600	1700		UK, BBC World Service	3915as	5975as	6190af	6195va 7160as
			9410va 9510as 9740as	11940af	12095va	15190am	15310as

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1600	1700	15400af	15565va	17640me	17790as	17830af	21470af	21660af			
		USA, Armed Forces Network			3903usb	4278usb	4319usb	4993usb			
		6350usb	6458usb	10320usb	12579usb	12689usb	13362usb				
1600	1700	USA, KALJ Dallas TX		13815va							
1600	1700	USA, KIMF Otero NM		5835na							
1600	1700	USA, KJES Vado NM		11715na							
1600	1700	USA, KTBN Salt Lk City UT			15590na						
1600	1700	USA, Voice of America		6035af	6110va	7125va	9575va	9645va			
		13600va	13710af	15395va	15205va	15420af	15485af	15445va			
		17715af	17895af	17640va							
1600	1700	USA, WBCQ Kennebunk, ME			17495na						
1600	1700	USA, WEWN Birmingham AL			13615na	15745na					
1600	1700	USA, WHRA Greenbush ME			17650va						
1600	1700	USA, WHRI Noblesville IN			13760na	15105va					
1600	1700	USA, WINB Red Lion PA		13570am							
1600	1700	USA, WJIE Louisville KY		7490am	13595am						
1600	1700	USA, WMLK Bethel PA		9465eu							
1600	1700	USA, WRMI Miami FL		15725na							
1600	1700	USA, WRNO New Orleans LA			7395am						
1600	1700	USA, WSHB Cypress Creek SC			18910af						
1600	1700	USA, WTJC Newport NC		9370na							
1600	1700	USA, WWCR Nashville TN			9475na	12160na	13845na				
		15685na									
1600	1700	USA, WWRB Manchester TN			9320na	12172na					
1600	1700	USA, WYFR Okeechobee FL			6280as	11830na	17760na	18980eu			
		21455eu									
1600	1700	Zimbabwe, SWR Africa		6145do							
1630	1700	Australia, Radio		17750s							
1630	1700	Australia, Voice International			11685as						
1630	1700	Austria, AWR		9850af							
1630	1700	Austria, Radio Austria Intl			17865na						
1630	1700	Egypt, Radio Cairo		15255af							
1630	1700	Georgia, Georgian Radio			6180me						
1630	1700	Guam, AWR/KSDA		11560as	11980as	15495as	17630as				
1630	1700	UAE, AWR		9890as							
1630	1700	as									
1630	1700	UK, BBC World Service		15420af	21490af						
1645	1700	Tajikistan, Radio		7245as							
1650	1700	mtwhf									
		New Zealand, Radio NZ Intl			11980pa						

1700 UTC - 12PM E / 11AM C / 9AM P

1700	1727	Czech Rep, Radio Prague Intl		5930va	17485va						
1700	1730	France Radio France Intl		11615af	11995af	12015af	15605af	17850af			
1700	1730	Jordan, Radio		11690na							
1700	1730	wh a									
1700	1730	Russia, Bible Voice BC		7435me							
1700	1730	South Africa, Channel Africa		17870af							
1700	1730	mtwhf			9630af						
1700	1730	UK, BBC World Service		6005af							
1700	1750	New Zealand, Radio NZ Intl		11980pa							
1700	1756	China, China Radio Intl		7150af	9570af	9695as	11910af				
1700	1756	Romania, R Romania Intl		7155eu	9625eu	9690eu	11940eu				
1700	1800	Anguilla, Caribbean Beacon		11775am							
1700	1800	Australia, Radio		9475as	9580va	9660pa	9815pa	11880va			
		12080va		15240pa	15515va	21725pa	21820as				
1700	1800	Australia, Voice International			11685as						
1700	1800	Canada, CBC Northern Service		9625do							
1700	1800	Canada, CFRX Toronto ON		6070do							
1700	1800	Canada, CFVP Calgary AB		6030do							
1700	1800	Canada, CKZN St John's NF		6160do							
1700	1800	Canada, CKZU Vancouver BC		6160do							
1700	1800	Costa Rica, University Network		5030am	6150am	7375am	9725sa				
		11870am		13750na	17645as						
1700	1800	Egypt, Radio Cairo		15255af							
1700	1800	mtwhf									
1700	1800	Eqt Guinea, Radio Africa		15185af							
1700	1800	Germany, Deutsche Welle		6140eu							
1700	1800	a			6015eu						
1700	1800	Germany, Overcomer Ministries			11735va	13820va					
1700	1800	Germany, United Methodist Ch			15725eu	17705na					
1700	1800	a									
1700	1800	Greece, Voice of		9420eu							
1700	1800	Japan, Radio		9505na	11970na	15355af					
1700	1800	Russia, Voice of Russia		9470me	9590as	9830me					
1700	1800	South Africa, Radio Veritas		3230af							
1700	1800	Sri Lanka, SLBC		4940as							
1700	1800	Taiwan, R Taipei Intl		11550as							
1700	1800	UK, BBC World Service		3255af	3915as	5975as	6190af	6195va			
		7160as		9410va	9510as	12095va	15310as	15400af	15420af		
		15565va		17640me	17830af	21470af					
1700	1800	USA, Armed Forces Network			3903usb	4278usb	4319usb	4993usb			
		6350usb		6458usb	10320usb	12579usb	12689usb	13362usb			
1700	1800	USA, KALJ Dallas TX			13815va						
1700	1800	USA, KIMF Otero NM			5835na						
1700	1800	USA, KTBN Salt Lk City UT			15590na						
1700	1800	USA, Voice of America		6040va	6110va	7125va	9645va	9760va			
		13710af		15205va	15395va	15240af	15445af	17895af			
1700	1800	mtwhf									
		USA, Voice of America		5990va	6045va	9525va	9795va	11955va			
		12005va		15255va							
1700	1800	USA, WBCQ Kennebunk, ME			17495na						

1700	1800	USA, WEWN Birmingham AL		13615na							
1700	1800	USA, WHRA Greenbush ME		17650va							
1700	1800	USA, WHRI Noblesville IN		13760na	15105va						
1700	1800	USA, WINB Red Lion PA		13570am							
1700	1800	USA, WJIE Louisville KY		7490am	13595am						
1700	1800	USA, WMLK Bethel PA		9465eu	15265eu						
1700	1800	USA, WRMI Miami FL		15725na							
1700	1800	USA, WRNO New Orleans LA			7395am						
1700	1800	USA, WSHB Cypress Creek SC			15190af						
1700	1800	USA, WTJC Newport NC		9370na							
1700	1800	USA, WWCR Nashville TN			9475na	12160na	13845na				
		15685na									
1700	1800	USA, WWRB Manchester TN			9320na	12172na					
1700	1800	USA, WYFR Okeechobee FL			18980eu	21455eu					
1700	1800	Zimbabwe, SWR Africa		6145do							
1715	1730	mtwhf									
1715	1730	UK, BBC World Service		15390am							
		Vatican City, Vatican Radio		15595eu	4005eu	5890eu	7250eu	9645eu			
1725	1745	vi/mtwhf									
1730	1745	Israel, Kol Israel		11605va	17545va						
1730	1745	vi			15435irr	21695irr					
1730	1745	UK, BBC World Service		3390va	7230va	9525va					
1730	1800	Australia, Radio		17750as							
1730	1800	Guam, AWR/KSDA		9385me							
1730	1800	Liberia, ELWA		4760do							
1730	1800	vi/mtwhf									
1730	1800	Malta, VO Mediterranean		9850eu							
1730	1800	Netherlands, Radio		6020af	7120af	11655af					
1730	1800	Philippines, Radio Pilipinas			11730me	11890me	15190me				
1730	1800	s whfa									
1730	1800	Russia, Bible Voice BC		7435me							
1730	1800	Slovakia, R Slovakia Intl		5915eu	6055eu	7345eu					
1730	1800	Swaziland, TWR		3200af	9500af						
1730	1800	Switzerland, Swiss R Intl		9755va	13790af	15555va					
1730	1800	Vatican City, Vatican Radio			13765af	15570af	17515af				
1735	1745	vi/th									
1745	1800	Paraguay, Radio Nacional		9739sa							
1745	1800	Bangladesh, Bangla Betar		7185eu	9550eu	15520eu					
1745	1800	India, All India Radio		7410eu	9445af	9950eu	11620eu	11925af			
		13605af		15075af	15155af	17670af					
1751	1800	New Zealand, Radio NZ Intl			15265pa						

1800 UTC - 1PM E / 12PM C / 10AM P

1800	1815		Russia, Bible Voice BC	7435me					
1800	1815	as	Russia, Bible Voice BC	5880eu					
1800	1827		Czech Rep, Radio Prague Intl		5930va	7315va			
1800	1827		Vietnam, Voice of	5955eu	7145eu	9730eu			
1800	1830		Azerbaijan, Voice of	6110eu	9155eu				
1800	1830		Egypt, Radio Cairo	15255af					
1800	1830		Germany, Deutsche Welle		3995au				
1800	1830	s	Germany, Universal Life	11840af					
1800	1830		South Africa, Channel Africa		17870af				
1800	1830		UK, BBC World Service	5975as	9510as				
1800	1830		UK, RTE Radio	9895me					
1800	1900		Anguilla, Caribbean Beacon		11775am				
1800	1900		Australia, Radio	5995pa	6080pa	7240va	9475as	9580va	
			9710pa	9815pa	11880va	12080va	15515va	17750as	
			21725pa	21820as					
1800	1900		Australia, Voice International		11685as				
1800	1900		Bangladesh, Bangla Betar	7185eu		9550eu	15520eu		
1800	1900		Canada, CBC Northern Service	9625do					
1800	1900		Canada, CFRX Toronto ON	6070do					
1800	1900		Canada, CFVP Calgary AB	6030do					
1800	1900		Canada, CKZN St John's NF	6160do					
1800	1900		Canada, CKZU Vancouver BC	6160do					
1800	1900		Costa Rica, University Network	5030am	6150am	7375am	9725sa		
			11870am	13750na	17645as				
1800	1900	mtwhf	Eqt Guinea, Radio Africa		15185af				
1800	1900		Germany, Deutsche Welle	6140eu					
1800	1900		Germany, United Methodist Ch	11735va	13820va				
1800	1900		India, All India Radio	7410eu	9445af	9950eu	11620eu	11925af	
			13605af	15075af	15155af	17670af			
1800	1900		Kuwait, Radio	11990as					
1800	1900		Liberia, ELWA	4760do					
1800	1900		Liberia, R Liberia Intl	5100do					
1800	1900		Netherlands, Radio	6020af	7120af	11655af			
1800	1900		New Zealand, Radio NZ Intl		15265pa				
1800	1900		Philippines, Radio Pilipinas		11730me	11890me	15190me		
1800	1900		Poland, Radio Polonia	5995eu	7285eu				
1800	1900		Russia, University Network	9890as					
1800	1900		Russia, Voice of Russia	7290eu	7335af	7340eu	9590as	9830af	
			11510af						
1800	1900	as	Russia, Voice of Russia	5950eu	6175eu				
1800	1900	s	South Africa, Radio League	3215af					
1800	1900		South Africa, Radio Veritas	3230af					
1800	1900		Sri Lanka, SLBC	4940as					
1800	1900		Swaziland, TWR	3200af	9500af				

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1800	1900	Taiwan, R Taipei Intl	3955eu					
1800	1900	UK, BBC World Service	3255af	6190af	6195va	9410va	21470af	
		12095me 15310va	15400af	15420af	15565me	17830af	21470af	
1800	1900	USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb		
		6350usb 6458usb	10320usb	12579usb	12689usb	13362usb		
1800	1900	USA, KAUJ Dallas TX	13815va					
1800	1900	USA, KIMF Otero NM	11885na					
1800	1900	USA, KTBN Salt Lk City UT		15590na				
1800	1900	USA, Voice of America	6035af	6040va	9760va	9885va	11975af	
		13710af 15240af	15580af	17895af				
1800	1900	USA, WBCQ Kennebunk, ME		17495na				
1800	1900	USA, WEWN Birmingham AL	13615na					
1800	1900	USA, WHRA Greenbush ME	17650va					
1800	1900	USA, WHRI Noblesville IN	9495va	13760na				
1800	1900	USA, WINB Red Lion PA	13570am					
1800	1900	USA, WJIE Louisville KY	7490am	13595am				
1800	1900	USA, WMLK Bethel PA	9465eu	15265eu				
1800	1900	USA, WRMI Miami FL	15725na					
1800	1900	USA, WRNO New Orleans LA	7395am					
1800	1900	USA, WSHB Cypress Creek SC	18910af					
1800	1900	USA, WTJC Newport NC	9370na					
1800	1900	USA, WWCR Nashville TN	15685na	9475na	12160na	13845na		
1800	1900	USA, WWRB Manchester TN	9320na	12172na				
1800	1900	USA, WYFR Okeechobee FL	18980eu					
1800	1900	Yemen, Rep of Yemen Radio	9780me					
1800	1900	Zimbabwe, SWR Africa	6145do					
1815	1845	Russia, Bible Voice BC	7435me					
1815	1900	Russia, Bible Voice BC	5880eu					
1830	1855	Belgium, Radio Vlaanderen Intl	7465as	13650eu	13685eu			
1830	1900	Bulgaria, Radio	5800eu					
1830	1900	Georgia, Georgian Radio	11910eu					
1830	1900	South Africa, AWR	5960af	6095af	11985af			
1830	1900	South Africa, AWR	11985af					
1830	1900	Sweden, Radio	6065va					
1830	1900	Sweden, Radio	5840va					
1830	1900	UK, BBC World Service	6005af	9630af				
1830	1900	UK, RTE Radio	13640na	21630af				
1830	1900	UK, United Nations Radio	9850me	13775af				
1845	1900	Russia, Bible Voice BC	7435me					
1845	1900	Russia, Bible Voice BC	5880eu					

1900 UTC - 2PM E / 1PM C / 11AM P

1900	1927	Vietnam, Voice of	7145eu	9730eu				
1900	1930	Germany, Deutsche Welle	3995eu					
1900	1930	Greece, Voice of	7475eu	9420eu	17705na			
1900	1930	Philippines, Radio Pilipinas	11730me	11890me	15190me			
1900	1945	Germany, Deutsche Welle	11765af	13780af	15275af	17560af		
		17810af 21780af						
1900	1945	India, All India Radio	7410eu	9445af	11620eu	11925af	13605af	
		15075af 15155af	17670af					
1900	1945	USA, WYFR Okeechobee FL		15115eu	18930eu			
1900	1956	China, China Radio Intl	9440af	9585af				
1900	1956	North Korea, Voice of	4405as	7505eu	11335eu			
1900	2000	Anguilla, Caribbean Beacon		11775am				
1900	2000	Argentina, RAE	9690eu	15345eu				
1900	2000	Australia, Radio	6080pa	7240va	9475as	9500as	9580va	
		9815pa 11880va	12080va	15240va	21820as			
1900	2000	Australia, Voice International		13770as				
1900	2000	Botswana, Radio	3356do	4820do	7255do			
1900	2000	Canada, CBC Northern Service	9625do					
1900	2000	Canada, CFRX Toronto ON	6070do					
1900	2000	Canada, CFVP Calgary AB	6030do					
1900	2000	Canada, CKZN St John's NF	6160do					
1900	2000	Canada, CKZU Vancouver BC	6160do					
1900	2000	Costa Rica, University Network	5030am	6150am	7375am	9725sa		
		11870am 13750na	17645as					
1900	2000	Eat Guinea, Radio Africa		15185af				
1900	2000	Ghana, Ghana BC Corp		3366do	4915do			
1900	2000	Kuwait, Radio	11990as					
1900	2000	Liberia, ELWA	4760do					
1900	2000	Liberia, R Liberia Intl	5100do					
1900	2000	Malaysia, Radio	7295do					
1900	2000	Namibia, NBC	3270af	3290af				
1900	2000	Netherlands, Radio	6020af	7120af	11655af			
1900	2000	New Zealand, Radio NZ Intl		15265pa				
1900	2000	Nigeria, Radio/Enugu	6025do					
1900	2000	Nigeria, Radio/Ibadan	6050do					
1900	2000	Nigeria, Radio/Kaduna	4770do	6090do	9570do			
1900	2000	Nigeria, Radio/Lagos	3326do	4990af				
1900	2000	Nigeria, Voice of	7255af	15150af				
1900	2000	Papua New Guinea, NBC		4890do	9675af			
1900	2000	Russia, Bible Voice BC	7435me					

1900	2000	Russia, University Network	9890as					
1900	2000	Russia, Voice of Russia	5950eu	6175eu	7290eu	7335af		
		7340eu 7360eu	7440af	9875af	11510af			
1900	2000	South Korea, R Korea Intl	5975va	7275va				
1900	2000	Sri Lanka, SLBC	4940as					
1900	2000	Sri Lanka, SLBC	6010eu					
1900	2000	Swaziland, TWR	3200af					
1900	2000	Thailand, Radio	9535eu					
1900	2000	Uganda, Radio	4976do	5026do	7196do			
1900	2000	UK, BBC World Service	3255af	6005af	6190af	6195va	9410va	
		9630af 12095af	15310va	15400af	17830af			
1900	2000	USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb		
		6350usb 6458usb	10320usb	12579usb	12689usb	13362usb		
1900	2000	USA, KAUJ Dallas TX	13815va					
1900	2000	USA, KIMF Otero NM	11885na					
1900	2000	USA, KJES Vado NM	15385au					
1900	2000	USA, KTBN Salt Lk City UT		15590na				
1900	2000	USA, Voice of America	4950af	6035af	7415af	9525va	9690va	
		9760va 9785va	11870va	11975af	12015va	13640va	13710af	
		15240af 15180va	15580af	17895af				
1900	2000	USA, Voice of America	5965va	9840va	11720va	11970va	15205va	
		15410va						
1900	2000	USA, WBCQ Kennebunk, ME	17495na					
1900	2000	USA, WBCQ Kennebunk, ME	7415na					
1900	2000	USA, WBCQ Kennebunk, ME	9335na					
1900	2000	USA, WEWN Birmingham AL	13615na					
1900	2000	USA, WHRA Greenbush ME	17650va					
1900	2000	USA, WHRI Noblesville IN	9495va	13760na				
1900	2000	USA, WINB Red Lion PA	13570am					
1900	2000	USA, WJIE Louisville KY	7490am	13595am				
1900	2000	USA, WMLK Bethel PA	9495eu	15265eu				
1900	2000	USA, WRMI Miami FL	15725na					
1900	2000	USA, WRNO New Orleans LA	7395am					
1900	2000	USA, WSHB Cypress Creek SC	15665eu	18910af				
1900	2000	USA, WSHB Cypress Creek SC	18910af					
1900	2000	USA, WTJC Newport NC	9370na					
1900	2000	USA, WWCR Nashville TN	15685na	9475na	12160na	13845na		
1900	2000	USA, WWRB Manchester TN	9320na	12172na				
1900	2000	USA, WYFR Okeechobee FL	3230af					
1900	2000	Vanuatu, Radio	3945af	7260do				
1900	2000	Zambia, Christian Voice	4965do					
1930	2000	Austria, Radio Austria Intl	5945eu	6155eu				
1930	2000	Bosnia/Serbia, R. Yugoslavia	6100eu					
1930	2000	Georgia, Georgian Radio	11760eu					
1930	2000	Greece, Voice of	7475eu					
1930	2000	Greece, Voice of	9420eu	17705na				
1930	2000	Iran, VOIRI	6110eu	7215eu	11695af	15140af		
1930	2000	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu			
1930	2000	Solomon Islands, SIBC	5020do	9545do				
1930	2000	Switzerland, Swiss R Intl	9755va	13660va	15485va	17660va		
1930	2000	Turkey, Voice of	9890eu					
1935	1955	Italy, RAI Intl	5970eu	9745eu				
1940	1945	Turkmenistan, Turkmen Radio		4930as				
1945	2000	Albania, Radio Tirana Intl		7210na	9510na			

2000 UTC - 3PM E / 2PM C / 12PM P

2000	2015	Solomon Islands, SIBC	5020do	9545do				
2000	2020	Turkey, Voice of	9890eu					
2000	2025	Netherlands, Radio	6020af	7120af	11655af			
2000	2027	Iran, VOIRI	6110eu	7215eu	11695af	15140af		
2000	2028	Hungary, Radio Budapest		6025eu	7135eu			
2000	2030	Israel, Kol Israel	6280va	9435af	13720va	15640va		
2000	2030	Mongolia, Voice of	12015eu					
2000	2030	Solomon Islands, SIBC	5020do	9545do				
2000	2030	Switzerland, Swiss R Intl	9755va	13660va	15485va	17660va		
2000	2030	Vatican City, Vatican Radio		7365af	9660af	11625af		
2000	2045	Germany, Deutsche Welle		6180eu				
2000	2045	Iraq, Radio Iraq Intl	9687ing	11787eu				
2000	2050	New Zealand, Radio NZ Intl		15265pa				
2000	2056	China, China Radio Intl	5965eu	9440eu	9840eu	11640af	11790eu	
		13630af						
2000	2100	Algeria, Radio Algiers Intl		11715eu	15160eu			
2000	2100	Anguilla, Caribbean Beacon		11775am				
2000	2100	Australia, Radio	7240va	9475as	9500as	9580va	9815pa	
		11880va 12080va	15240va	21820as				
2000	2100	Australia, Voice International		13770as				
2000	2100	Botswana, Radio	3356do	4820do	7255do			
2000	2100	Canada, CBC Northern Service	9625do					
2000	2100	Canada, CFRX Toronto ON	6070do					
2000	2100	Canada, CFVP Calgary AB	6030do					
2000	2100	Canada, CKZN St John's NF	6160do					
2000	2100	Canada, CKZU Vancouver BC	6160do					

2100 UTC - 4PM E / 3PM C / 1PM P

2130	2200		Australia, ABC NT Tennant Crk	4910do		
2130	2200		Australia, Radio	11660as		
2130	2200	th	Belarus, Radio Belarus Intl	7105eu	7210eu	
2130	2200		Guam, AWR/KSDA	11960as	11980as	
2130	2200		Iran, VOIRI 9780au	11740au		
2130	2200		Turkey, Voice of	9525va		
2130	2200	tf	UK, BBC World Service	11680sa		
2130	2200	f	UK, Wales Radio Intl	7325eu		
2130	2200		Uzbekistan, Radio Tashkent	5025eu	7105eu	11905eu

Shortwave Guide



2200 UTC - 5PM E / 4PM C / 2PM P

2200	2227	Iran, VOIRI 9780as	11740au				
2200	2228	Hungary, Radio Budapest	3975eu	6025eu			
2200	2229	Canada, Radio Canada Intl	5850va	6045va	9770va	9805va	
2200	2230	Bosnia/Serbia, R. Yugoslavia	6100eu				
2200	2230	India, All India Radio	7410eu	9445eu	9575au	9910au	9950eu
		11620va	11715au				
2200	2230	South Korea, R Korea Intl	3955eu				
2200	2230	Turkey, Voice of	9525va				
2200	2230	USA, Voice of America	6035af	7215va	7415af	9770va	9890va
		11655af	11760va	11975af	13710af	15185va	15290va
		15305va	17735va	17820va			
2200	2245	Egypt, Radio Cairo	9990eu				
2200	2245	USA, WYFR Okeechobee FL		15565af			
2200	2256	China, China Radio Intl	7170eu				
2200	2300	Anguilla, Caribbean Beacon	6090am				
2200	2300	Australia, ABC NT Alice Springs	2310do	4835irr			
2200	2300	Australia, ABC NT Katherine	5025do				
2200	2300	Australia, ABC NT Tennant Crk	4910do				
2200	2300	Australia, Radio	5995pa	6020pa	9580va	11650va	
		11660as	13620as	15230as	17715va	17795va	21740va
2200	2300	Bulgaria, Radio	5800eu	7500eu			
2200	2300	Canada, CBC Northern Service	9625do				
2200	2300	Canada, CFRX Toronto ON	6070do				
2200	2300	Canada, CFVP Calgary AB	6030do				
2200	2300	Canada, CKZN St John's NF	6160do				
2200	2300	Canada, CKZU Vancouver BC	6160do				
2200	2300	Costa Rica, R for Peace Intl	15040am				
2200	2300	Costa Rica, University Network	5030am	6150am	7375am	9725sa	
		11870am	13750na	17645as			
2200	2300	mtwhf					
2200	2300	vi					
2200	2300	Eat Guinea, Radio Africa	15185af				
2200	2300	Ghana, Ghana BC Corp	3366do	4915do			
2200	2300	Guyana, Voice of	3290do	5950do			
2200	2300	Liberia, R Liberia Intl	5100do				
2200	2300	Malaysia, Radio	7295do				
2200	2300	Mexico, Radio Mexico Intl	9705am	11770am			
2200	2300	Namibia, NBC	3270af				
2200	2300	New Zealand, Radio NZ Intl	17675pa				
2200	2300	Nigeria, Radio/Enugu	6025do				
2200	2300	Nigeria, Radio/Kaduna	4770do	6090do	9570do		
2200	2300	Nigeria, Radio/Lagos	3326do	4990af			
2200	2300	Nigeria, Voice of	7255af	15150af			
2200	2300	Russia, University Network	9890as				
2200	2300	vi					
2200	2300	as					
2200	2300	Solomon Islands, SIBC	5020do	9545do			
2200	2300	Spain, R Exterior Espana	9595af	9680eu			
2200	2300	Sri Lanka, SLBC	4940as				
2200	2300	Taiwan, R Taipei Intl	9355eu				
2200	2300	UK, BBC World Service	5965as	5975va	6195va	7105as	
		11685as	12095va	15400af	17830af		
2200	2300	Ukraine, R Ukraine Intl	5905eu	6020eu	7240eu	9560eu	
2200	2300	USA, Armed Forces Network	3903usb	4278usb	4319usb		
		4993usb	6350usb	6458usb	10320usb	12579usb	12689usb
		13362usb					
2200	2300	USA, KAUJ Dallas TX	13815va				
2200	2300	USA, KIMF Otero NM	11885na				
2200	2300	USA, KTVN Salt Lk City UT	15590na				
2200	2300	USA, KWHR Naalehu HI	17510as				
2200	2300	USA, WBCQ Kennebunk, ME	7415na	9335na	17495na		
2200	2300	USA, WEWN Birmingham AL	9975na	17595na			
2200	2300	USA, WHRA Greenbush ME	7580va	17650va			
2200	2300	USA, WHRI Noblesville IN	5745va	9495va			
2200	2300	USA, WINB Red Lion PA	13570am				
2200	2300	USA, WJIE Louisville KY	7490am	13595am			
2200	2300	USA, WRMI Miami FL	15725na				
2200	2300	USA, WRNO New Orleans LA	7395am				
2200	2300	USA, WSHB Cypress Creek SC	7510eu				
2200	2300	USA, WSHB Cypress Creek SC	15285sa				
2200	2300	USA, WTJC Newport NC	9370na				
2200	2300	USA, WWCR Nashville TN	5070na	7465na	9475na		
		13845na					
2200	2300	USA, WWRB Manchester TN	9320na	12172na			
2200	2300	USA, WYFR Okeechobee FL	11740na				
2200	2300	vi					
2200	2300	Vanuatu, Radio	3945al	7260do			
2200	2300	Zambia, Christian Voice	4965do				
2205	2230	Italy, RAI Intl	11895as				
2230	2255	Belgium, Radio Vlaanderen Intl	13700na				
2230	2257	Czech Rep, Radio Prague Intl	7345va	9435va			
2230	2300	mtwhfa					
2230	2300	Albania, Radio Tirana Intl	7130eu	9540eu			
2230	2300	Australia, Radio	9475as				
2230	2300	Austria, Radio Austria Intl	5945eu	6155eu			
2230	2300	Cuba, Radio Havana	9550am				
2230	2300	Sweden, Radio	6065va				
2245	2300	India, All India Radio	9705as	9950as	11620as	13605as	

2300 UTC - 6PM E / 5PM C / 3PM P

2300	0000	Anguilla, Caribbean Beacon	6090am				
2300	0000	Australia, ABC NT Alice Springs	2310do	4835irr			
2300	0000	Australia, ABC NT Katherine	5025do				
2300	0000	Australia, ABC NT Tennant Crk	4910do				
2300	0000	Australia, Radio	9475as	9580va	9660pa	11650pa	11660as
		12080va	13620as	15230as	17715va		
2300	0000	Bulgaria, Radio	9400na	11700na			
2300	0000	Canada, CBC Northern Service	9625do				
2300	0000	Canada, CFRX Toronto ON	6070do				
2300	0000	Canada, CFVP Calgary AB	6030do				
2300	0000	Canada, CKZN St John's NF	6160do				
2300	0000	Canada, CKZU Vancouver BC	6160do				
2300	0000	China, China Radio Intl	5990na	13680na			
2300	0000	Costa Rica, R for Peace Intl	7445va	15040va			
2300	0000	Costa Rica, University Network	5030am	6150am	7375am	9725sa	
		11870am	13750na	17645as			
2300	0000	Egypt, Radio Cairo	9900am				
2300	0000	vi					
2300	0000	Ghana, Ghana BC Corp	3366do	4915do			
2300	0000	Guyana, Voice of	3290do	5950do			
2300	0000	India, All India Radio	9705as	9950as	11620as	13605as	
2300	0000	Liberia, R Liberia Intl	5100do				
2300	0000	Malaysia, Radio	7295do				
2300	0000	Mexico, Radio Mexico Intl	9705am	11770am			
2300	0000	Namibia, NBC	3270af				
2300	0000	New Zealand, Radio NZ Intl	17675pa				
2300	0000	Romania, R Romania Intl	7195eu	9510na	9570eu		
		11940na					
2300	0000	Russia, University Network	9890as				
2300	0000	Singapore, SBC Radio One	6150do				
2300	0000	Sri Lanka, SLBC	4940as				
2300	0000	UK, BBC World Service	3915as	5965as	5975va	6195va	7105as
		11685as	11945as	11955as	12095va	15280as	
2300	0000	USA, Armed Forces Network	3903usb	4278usb	4319usb	4993usb	
		6350usb	6458usb	10320usb	12579usb	12689usb	13362usb
2300	0000	USA, KAUJ Dallas TX	13815va				
2300	0000	USA, KIMF Otero NM	11885na				
2300	0000	USA, KTVN Salt Lk City UT	15590na				
2300	0000	USA, KWHR Naalehu HI	17510as				
2300	0000	USA, Voice of America	6180va	7215va	7205va	9620va	9770va
		9780va	11735va	11760va	11805va	13640va	15135va
		15205va	15290va	15135va	17735va	17820va	17495na
2300	0000	USA, WBCQ Kennebunk, ME	7415na	9335na			
2300	0000	USA, WEWN Birmingham AL	9975na	17595na			
2300	0000	USA, WHRA Greenbush ME	7580eu				
2300	0000	USA, WHRI Noblesville IN	5745va	9495va			
2300	0000	USA, WINB Red Lion PA	12160am				
2300	0000	USA, WJIE Louisville KY	7490am	13595am			
2300	0000	USA, WRMI Miami FL	15725na				
2300	0000	USA, WRMI Miami FL	15725na				
2300	0000	USA, WRNO New Orleans LA	7355am				
2300	0000	USA, WSHB Cypress Creek SC	7510af				
2300	0000	USA, WTJC Newport NC	9370na				
2300	0000	USA, WWCR Nashville TN	5070na	7465na			
		13845na					
2300	0000	USA, WWRB Manchester TN	5050na	5085na	6890na		
2300	0000	USA, WYFR Okeechobee FL	5985sa	11855sa	15170sa	15400sa	
2300	0000	vi					
2300	0000	Vanuatu, Radio	3945al	7260do			
2300	0000	Zambia, Christian Voice	4965do				
2300	2329	Canada, Radio Canada Intl	5960am	9590am	11865am		
2300	2330	Cuba, Radio Havana	9550am				
2300	2330	Nigeria, Radio/Enugu	6025do				
2300	2330	Nigeria, Radio/Kaduna	4770do	6090do			
2300	2330	Nigeria, Radio/Lagos	3326do	4990af			
2300	2330	Solomon Islands, SIBC	5020do	9545do			
2300	2345	Germany, Deutsche Welle	9470as	9815as	13690as	21790as	
2300	2345	USA, WYFR Okeechobee FL	11740na				
2300	2350	Turkey, Voice of	6020va	9655va			
2320	2330	Kyrgyz, Kyrgyz Radio	4010as	4795as			
2330	0000	Australia, Radio	11695as	15415as			
2330	0000	Canada, Radio Canada Intl	5960na	9590na			
2330	0000	Lithuania, R Vilnius	9875eu				
2330	0000	Netherlands, Radio	6165na	9845na			
2330	0000	Switzerland, Swiss R Intl	9885sa	11660sa			
2330	0000	UAE, Gospel For Asia	6145as				
2330	0000	UK, BBC World Service	6035as				
2330	2345	vi					
2330	2357	Libya, Voice of Africa	15435irr	21695irr			
2330	2357	China, China Radio Intl	5990na	13680na			
2330	2357	Czech Rep, Radio Prague Intl	9745na	21455usb			
2330	2357	Vietnam, Voice of	9840as	12020as			



Notes:

- BBCWS stream abbreviations:** (am)=Americas; (eu)=Europe/N. Africa; (me)=Middle East, SW Asia, CIS (former Soviet Union); (wcaf)=West and Central Africa; (esaf)=East and Southern Africa; (af)=both (wcaf) and (esaf); (sas)=South Asia; (eas)=East Asia.
- Listings for the **US-based independent shortwave broadcasters** are limited to general interest programming that departs from their primary formats of religious and political fare.
- Listings for the **Voice of America's Africa Service** have been added to the Guide this month, along with suggested frequencies. There generally is good reception of this service state-side, especially in eastern North America.

0000 UTC / 7pm E / 4pm P - Page 43 Freqs

BBC WORLD SERVICE (am) - 5975, 9825, 12095

0000 M World Briefing, T-S News; 0001 S Play of the Week (drama); 0005 T-A Outlook (magazine); 0020 M Sports Roundup; 0030 M The World Today; 0045 T Write On, W Heart & Soul (spiritual matters), H/A Westway (drama serial), F What's the Problem? (advice).

BBC WORLD SERVICE (oas) - 6195, 15280, 15360

0000 D World Briefing; 0020 D Sports Roundup; 0030 S Agenda (trends), M-A World Business Report; 0045 M Letter from America, T/W/F/A Analysis, H From Our Own Correspondent.

BBC WORLD SERVICE (sas) - 5965, 9410, 11955, 15310, 17790

0000 D World Briefing; 0020 D Sports Roundup; 0030 S Agenda (trends), M-F The World Today, A Reporting Religion.

HCJB Ecuador

0000 S DX Partyline, M Musical Mailbag, T-A News; 0010 T-A Studio 9 (on Latin America); 0030 S Saludos Amigos, M Mountain Meditations, T Inspirational Classics, W Words for Women, H Walkin' in the Sunshine (country music), F Book & Spade (archaeology), A Musica del Ecuador (folk); 0045 W Wonderful Words of Life (hymns), F Science, Scripture & Salvation.

RADIO AUSTRALIA

0000 D News; 0005 S The Europeans, A Feedback (letters, station news, on communications); 0010 M AWAY! (Aboriginal culture), T The Science Show, W The National Interest (Australian politics), H Background Briefing (documentary), F Hindsight (Australian history); 0030 A Country Breakfast (rural life).

RADIO BULGARIA

0000 D News; 0010 S Views Behind the News, M Folk Studio (Bulgarian folk music), T-A Events and Developments (current affairs review); 0020 T Sports; 0025 T-A Timeout for Music; 0030 A Bulgarian Plaza (cultural magazine) or Walks and Talks (interesting places); 0035 T-S Keyword Bulgaria (Bulgaria and things Bulgarian), F Answering Your Letters; 0045 T Magazine Economy, W Arts and Artists; H History Club, F The Way We Live, A Radio Bulgaria Calling (for radio hobbyists).

RADIO CANADA INTERNATIONAL

0000 D CBC News; 0005 S Quirks & Quarks (science), M Global Village (world music), T-A As It Happens (interviews with newsmakers) [began at 2330 M-F]; 0030 H Dispatches (world events in Canadian perspective).

RADIO EXTERIOR ESPANA

0000 S Visitors Book (travelers to Spain), M Window on Spain (culture), T-A News (international, Spain, Latin America); 0015 S/M Spanish history or culture series; 0025 S/M Rebroadcast of 0040 weekday programs, T-A Spanish pop music; 0030 T-A Press Review; 0035 S/T Radio Waves, W Chronicles (Spain & the US), H Entreemes (food & travel), F Africa Today, A Radio Club (letters); 0045 T-A A Language Without Bounds (Spanish lesson).

RADIO JAPAN - NHK WORLD

0000 D News; 0010 S Hello from Tokyo (listener contact), M Weekend Square; 0015 T-A 44 Minutes (magazine).

RADIO NETHERLANDS

0000 S/W Music 52-15 (international music), M Dutch Horizons, T Research File (science), H Documentary, F The Sound Fountain (ideas), A A Good Life (development issues); 0030 S Amsterdam Forum (conversations), M The Sound Fountain, T EuroQuest (Europe in context), W A Good Life, H Dutch Horizons, F Research File, A Documentary.

RADIO NEW ZEALAND INTERNATIONAL

0000 D RNZ News; 0006 S At the Movies, M-F Cadanza (light classics), A Digital Life; 0030 S Bookmarks.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

0000 S World of Radio, M Spiritual Awakening, T-A Freespeech Radio News (Pacific Reporters Against Censorship daily newscast); 0030 S RFPI Mailbag, M World of Radio, T/H/A Hightower Radio (commentary), W Counterspin (media analysis), F This Way Out (lesbian/gay magazine); 0035 T/H/A Earthwatch (ecology); 0040 T/H/A Earth & Sky (astronomy); 0045 T Tropical Conservation News Bureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

VOICE OF AMERICA (News Now)

0000 T-A News and Reports; 0015 T-A Focus (a topic in-depth); 0023 T-A Sports; 0030 T-A News Headlines; 0033 T-A Coast to Coast (American life); 0055 Government Editorial.

WBCQ, Maine

7415 kHz.: 0000 S The Real Amateur Radio Show, M Le Show (humor/entertainment), H Off the Hook (public telecommunications issues), F Uncle Ed's Musical Memories (cont'd from H 2330), A The Lost Discs Radio Show; 0030 S Fred Flintstone Music Show, H World of Radio, F Steppin' Out of Babylon.

WWCR, Tennessee

5070 kHz.: 0005 H The Bible's Greatest Heroes.
9475 kHz.: 0045 S Ask WWCR.

0100 UTC / 8pm E / 5pm P - Page 43 Freqs

BBC WORLD SERVICE (am) - 5975, 9525, 9825, 12095

0100 S/M The World Today, T-A News; 0105 T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Writing, F The Music Biz A Arts in Action; 0130 S World Business Review, T Charlie Gillett (world music), W UK Top 20, H Revolver (musician's picks), F John Peel (eclectic); 0145 S Letter from America (Alistair Cooke).

BBC WORLD SERVICE (oas) - 6195, 15280, 15360

0100 S The World Today, M-A News; 0105 M Talking Point (global phone-in), T-A Outlook (magazine); 0130 S In Praise of God (religious service); 0145 M-F Off the Shelf (readings), A Patterns of Faith.

BBC WORLD SERVICE (sas) - 5965, 9410, 11955, 15310, 17790

0100 D The World Today; 0130 S At the Edge of Asia or Assignment, A People and Politics.

CHINA RADIO INTERNATIONAL

0100 D News; 0110 S Report on Developing Countries, M-F Special Reports, A Global Review; 0120 S In the Spotlight (cultural magazine), A Listeners' Garden; 0130 M People in the Know (China's leading personalities), T Biz China, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

DEUTSCHE WELLE

0100 D News; 0105 S Talking Point (journalists), M Religion & Society, T-A Newslink (European current affairs); 0115 S Inside Europe, M Arts on the Air; 0130 T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCJB, Ecuador

0100 S Ham Radio Today, M Hour of Decision, T-A A New Beginning; 0115 T-A Slice of Infinity; 0130 S Studio 9 Weekend, M Renewing Your Mind, T-A Insight for Living; 0158 T-A Money Minute.

RADIO AUSTRALIA

0100 D News; 0105 S Correspondents' Report, A Asia Pacific (regional current affairs); 0110 M-F Asia Pacific; 0130 S Oz Sounds (new music releases), M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A RA Arts.

[Special service: 0105 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA

0100 D International News; 0110 M Weekly Review, T-S National News; 0115 T-S Viewpoint; 0130 M Reports & Music, T-S News Bulletin; 0135 T-A Time Out (sports); 0140 S/W DXers Unlimited, M Mailbag Show, T/H/F Caribbean Outlook, A Weekly Review; 0150 M Breakthrough (science report).

RADIO NETHERLANDS

0100 S/M News, T-A Newline; 0105 S Europe Unzipped, M Wide Angle (one issue focus).

RADIO NEW ZEALAND INTERNATIONAL

0100 D RNZ News; 0105 S Music feature, M-F In Touch with New Zealand (music, interviews, variety), A Eureka! (science); 0130 S The Band Programme (brass band music), A Health or Environment Matters.
[*may be preempted by live sport]

RADIO FOR PEACE INTERNATIONAL, Costa Rica

0100 S Making Contact, M Radio Nation ("The Nation" magazine), T Disability Radio Worldwide, W World of Radio, H A Public Affair, F Far Right Radio Review, A Continent of Media; 0130 S Alternative Radio (political/social analysis), T This Way Out (gay/lesbian magazine), W RFPI Mailbag, A World of Radio.

RADIO PRAGUE

0100 D News; 0105 S Insight Central Europe, M Letter from Prague, T-A Newswire; 0110 M Mailbox, T One on One (interview), W Witness (oral history), H ABC of Czech (language), F Economic Report, A The Arts; 0120 M Readings from Czech Literature, W Talking Point (Czech issues), H Czechs in History or Spotlight (travelogue), A Away from Politics (poetry).

RADIO SLOVAKIA INTERNATIONAL

0100 D News; 0105 S Front Page Review (Slovak press), M Weekly Newsreel T-A Topical Issue; 0110 S Various features, M Listeners' Tribune (letters, magazine, Slovak music), T Tourism News or Environmental Update, W Slovakia in an International Context, H Business News, F Culture News or Back Page News (the offbeat), A Education, Science and Regional News.

RADIO UKRAINE INTERNATIONAL

0100 D News; 0110 S Ukrainian Diary (weekly review), M Music from Ukraine, T-A Ukraine Today (magazine); 0115 S The Whole World on the Radio Dial (DX program); 0130 S Hello From Kiev (listener letters/music), M Roots (culture & education); 0145 T-A Closeup (current issues).

VOICE OF AMERICA (News Now)

0100 T-A News and Reports; 0123 T-A Sports; 0130 T-A News Headlines; 0133 T-F Business Report, A VOA News Review; 0145 T-F Dateline (news magazine); 0155 T-F Government Editorial.

VOICE OF VIETNAM

0100 D News; 0105 D Current Affairs; 0110 Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; 0115 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0120 S Music, A Literature and Arts.

WBCQ, Maine

7415 kHz.: 0100 S A Different Kind of Oldies Show, M Radio New York International, W Good Morning Maine, A Allan Weiner Worldwide.

RTE, Ireland

0130 S/M Sportsnews; T-A The News at Six.

VOICE OF AMERICA (Special English)

0130 T-A News; 0140 T Agriculture Today, W/H Science Report, F Environment Report, A In the News; 0145 T Science in the News, W Explorations, H Making of a Nation, F American Mosaic; A American Stories.

0200 UTC / 9pm E / 6pm P - Page 44 Freqs

BBC WORLD SERVICE (am) - 5975, 9525, 9825, 12095

0200 D News; 0205 M Wright Around the World (musical variety), T Health Matters, W Go Digital, H Discovery (science), F One Planet (ecology), A Science in Action; 0230 S Music Review, T Everywoman, W Omnibus (documentary), H Sports International, F Heritage or Documentary, A Documentary.

BBC WORLD SERVICE (oas) - 15280, 15360

0200 S/A The World Today, M-F News; 0205 M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Writing, H The Music Biz, F Arts in Action; 0230 S From Our Own Correspondent, M Charlie Gillett (world music), T UK Top 20, W Revolver (musician's choice), H John Peel (eclectic), A Jazzmatazz.

BBC WORLD SERVICE (sas) - 11955, 15310, 17790

0200 D The World Today; 0230 S From Our Own Correspondent, A Global Business.

HCJB, Ecuador

0200 S Studio 9 Weekend (continues), M The Sower, T-A Stories of Great Christians; 0215 M The World Today, T-A Rendezvous; 0230 S Did You Hear?, M Let My People Think, T-A Back to the Bible; 0245 S Specialized English; 0255 T-A Joni and Friends.

Shortwave Guide



RADIO AUSTRALIA

0200 D News; **0205** S Margaret Throsby (interviews and music), A Background Briefing (documentary); **0210** M-F The World Today (ABC Radio flagship news program).

[Special service: **0205** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO BUDAPEST

0200 D News; **0205** S Insight Central Europe; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine); **0220** A DX Corner.

RADIO CANADA INTERNATIONAL

0200 D News; **0205** S Business Sense, M Maple Leaf Mailbag (w/CIDX report bimonthly); **0210** T-A Canada Today (current events magazine); **0235** S/A Canada in the World, M/H Spotlight (arts & culture), T Media Zone (journalists discuss), W Maple Leaf Mailbag (w/CIDX report bimonthly), F Business Sense.

RADIO HABANA CUBA

0200 D International News; **0210** M From Habana (Cuban musicians), T-S National News; **0215** T-S Reports and music; **0230** M The Jazz Place or Top Tens, T-S News Bulletin; **0235** S World of Stamps, T-A Reports and music; **0250** S Cuban music.

RADIO KOREA INTERNATIONAL

0200 D News; **0210** S Friendship Unlimited (letters, DX news), M Korean Pop Interactive (requests), T-A News Commentary; **0215** T-A Seoul Calling (magazine); **0230** T Korea Today & Tomorrow, W Cultural Promenade, H Economic Radar, F Korea & Its Splendors, A Notes of Nostalgia (traditional music).

RADIO NEW ZEALAND INTERNATIONAL

0200 D RNZ News; **0205** S RPM (international documentaries), M-F In Touch with New Zealand (cont'd), A The Mix (new music).

RADIO FOR PEACE INTERNATIONAL, Costa Rica

0200 S Alternative Radio (cont'd), M New Dimensions ("progressive" ideas), T University Forum (interviews), W Continent of Media, H WINGS (women's news), F Disability Radio Worldwide, A RFPI Mailbag; **0230** S Far Right Radio Review, T Honoring Mother Earth: Indigenous Voices, W A World of Possibilities, H Global Community Forum (interviews), F A Woman's Voice, A University Forum (interviews).

RADIO PRAGUE

0200 D News; **0205** S Magazine (local color), M Letter from Prague, T-A Newsvision; **0210** S Saturday Music (a mix), M Mailbox, T One on One (interview), W Witness (oral history), H ABC of Czech (language), F Economic Report, A The Arts; **0220** M Readings from Czech Literature, W Talking Point (Czech issues), H Czechs in History or Spotlight (travelogue), A Away from Politics (poetry).

RADIO ROMANIA INTERNATIONAL

0200 D Radio Newswire; **0210** S The Week, M Focus, T-A Commentary; **0215** S World of Culture, M Sunday Studio, T Pro Memoria (history), W Business Club, H Society Today, F Cards on the Table (debate) or The Romanian Next to You (interview), A Challenge for the Future or Terra 2001; **0220** S RRI Encyclopedia, T Political Flash, W European Horizons; **0225** S Roots (culture/traditions), M Romanian by Radio, T/H/A Business Update, W Tourist News, F Listeners' Letterbox; **0230** S Radio Pictures, M Romanian Itineraries, T Pulse of Transition, W W Mother Nature (ecology), H Visit Romania, A Practical Guide; **0235** S Romanian Itineraries, M Listeners' Letterbox, T Performing Arts, W Youth Club, H Partners in a Changing World, A Cultural Survey; **0240** S, Bucharest Along the Centuries, T Pages of Romanian Literature, W/F Skylark (folk music), H Stage and Screen, A Spectator (voice of the people); **0245** S DX Mailbag, T Romanian Hits, H Romanian Musicians, A Romanian Folk Music At Its Best; **0250** M Romanian Folk Music At Its Best, T Sports Roundup, W Athlete of the Week, H Sports Club, F Football Flash, A Sports Weekend.

RADIO TAIPEI INTERNATIONAL

0200 D News; **0215** S Great Wall Forum (discussing the mainland), M Jade Bells & Bamboo Pipes (traditional music), T Culture Express, W Taiwan Today, H Discover Taiwan, F Taipei Magazine, A Groove Zone; **0230** S Mailbag Time, T Trends, W Confucius and Inspiration Beyond, H New Music Lounge, F People; **0245** M-F Let's Learn Chinese (M/W/F elementary, T/H intermediate), A Kaleidoscope (life in Taiwan).

[This schedule also airs at **0700** for western North America.]

VOICE OF RUSSIA

0200 D News; **0211** S News & Views, M Sunday Panorama, T-A Commonwealth Update; **0224** M Russia: People & Events; **0230** D News in Brief; **0232** S Moscow Yesterday & Today, M Timelines, T Folk Box, W Jazz Show, H Musical Portraits, F Music Around Us, A Christian Message from Moscow; **0146** F Music At Your Request; **0154** H Russia: People & Events.

WBCQ, Maine

7415 kHz.: **0200** S Marion's Attic (vintage recordings), M Radio New York International (cont'd), W Torah Talks, A Tasha Takes Control.

RADIO OSTERREICH INTERNATIONAL

0230 S Insight Central Europe, M Letter from Austria, T-A Report from Austria (magazine); **0235** M Network Europe; **0250** S Postbox.

RADIO SWEDEN

0230 S Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); **0245** T Sports Scan, W Close Up (profiles of Swedes-1st/3rd), F Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

VOICE OF VIETNAM

0230 D News; **0235** D Current Affairs; **0240** Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; **0245** T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; **0250** S Music, A Literature and Arts.

0300 UTC / 10pm E / 7pm P - Page 44 Freqs

BBC WORLD SERVICE (am) - 5975, 9525

0300 D World Briefing; **0320** D Sports Roundup; **0330** S Reporting Religion, M At the Edge of Asia or Assignment, T-A World Business Report; **0345** T/W/F/A Analysis, H From Our Own Correspondent.

BBC WORLD SERVICE (af) - 6005, 6190, 7160, 11765

0300 D World Briefing; **0320** D Sports Roundup; **0330** S Postmark Africa, M-F Network Africa, A African Quiz or This Week And Africa. (*from 0330)

BBC WORLD SERVICE (sas) - 15310, 17790, 21830

0300 D World Briefing; **0320** D Sports Roundup; **0330** S Reporting Religion, M World Business Review, T-A World Business Report; **0345** M Letter from America (Alistair Cooke), T/W/F/A Analysis, H From Our Own Correspondent.

BBC WORLD SERVICE (pas) - 15280, 15360*, 17760, 21660

0300 S World Briefing, M-A News; **0305** M One Planet (ecology), T Science in Action, W Health Matters, H Go Digital, F Discovery (science), A Wright Around the World (music requests); **0320** D Sports Roundup; **0330** S Reporting Religion, M Heritage or Documentary, T Documentary, W Everywoman, H Omnibus (documentary), F Sports International.

CHANNEL AFRICA

0300 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

CHINA RADIO INTERNATIONAL

0300 D News; **0310** S Report on Developing Countries, M-F Special Reports, A Global Review; **0320** S In the Spotlight (cultural magazine), A Listeners' Garden; **0330** M People in the Know (China's leading personalities), T Biz China, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

DEUTSCHE WELLE

0300 D News; **0305** S Saturday Review, M Sunday Review, T-A Newslink (European current affairs); **0315** S Spectrum (sci/tech), M Arts on the Air; **0330** T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCJB, Ecuador

0300 S DX Partyline, M Musical Mailbag, T-A News; **0310** T-A Studio 9 (on Latin America); **0330** S Saludos Amigos, M Mountain Meditations, T Inspirational Classics, W Words for Women, H Walkin' in the Sunshine (country music), F Book & Spade (archaeology), A Musica del Ecuador (folk); **0345** W Wonderful Words of Life (hymns), F Science, Scripture & Salvation.

RADIO AUSTRALIA

0300 D News; **0305** S Feedback (letters, station news, on communications), A Rural Reporter; **0310** M-F Regional Sports Report; **0320** M-F Pacific Focus (M business, T health, W environment, H sport, F culture); **0330** S All in the Mind, A In Conversation (about science); **0340** M Oz Music Show (rock), T Music Deli (diverse world/folk), W Blacktracker (contemporary Aboriginal music), H Australian Country Style, F Jazz Notes.

[Special service: **0305** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO BULGARIA

0300 D News; **0310** S Views Behind the News, M Folk Studio (Bulgarian folk music), T-A Events and Developments; **0320** T Sports; **0325** W-S Timeout for Music; **0330** T Bulgarian Plaza (cultural magazine) or Walks and Talks (interesting places); **0335** T Answering Your Letters, W-M Keyword Bulgaria (Bulgaria and things Bulgarian); **0345** S Radio Bulgaria Calling (for radio hobbyists), W Magazine Economy, H Arts and Artists, F History Club, A The Way We Live.

RADIO HABANA CUBA

0300 D International News; **0310** M Weekly Review, T-S National News; **0315** T-S Viewpoint; **0330** M Reports & Music, T-S News Bulletin; **0335** T-A Time Out (sports); **0340** S/W DXers Unlimited, M Mailbag Show, T/H/F Caribbean Outlook, A Weekly Review; **0350** M Breakthrough (science report).

RADIO NEW ZEALAND INTERNATIONAL

0300 S/A RNZ News*, M-F Pacific Regional News; **0305** S Sunday Drama* (radio plays), A Home Grown (NZ music, including *Musical Chairs*-artist feature **0330**); **0310** M Tagata o te Moana, T Top 5, W Pacific Report, H Mailbox (letters & DX news) or RNZI Talk (station info), F Dateline Pacific; **0330** T New Releases, W Tradewinds (Pacific commerce), H The World in Sport, F Pacific Correspondent. [*may be preempted by live sport].

RADIO FOR PEACE INTERNATIONAL, Costa Rica

0300 S Far Right Radio Review (cont'd), M Voices of Our World (Maryknoll program), T Honoring Mother Earth: Indigenous Voices (cont'd), W Living Enrichment Center, H Global Community Forum (cont'd), F A Woman's Voice (cont'd), A A World of Possibilities; **0330** S World Citizens Weekly Commentary, M Perspective (UN program), T In the Moment, W Peace Forum, H Scope (UN program), F Tropical Conservation Newshour (rainforests), A Newmaier Report; **0345** S/M Hightower Report (commentary), T-A UN Today; **0348** S/M Earthwatch (ecology); **0351** S/M Earth & Sky (astronomy); **0355** S/M World Opinion (on terrorism).

RADIO TAIPEI INTERNATIONAL

0300 D News; **0315** S Great Wall Forum (discussing the mainland), M Taiwan Economic Journal, T Jade Bells & Bamboo Pipes (traditional music), W New Music Lounge, H Taipei Magazine, F Taiwan Gourmet, A Kaleidoscope (life in Taiwan); **0330** S Asia Pacific (from Radio Australia), M People, W Confucius & Inspiration Beyond, H Life Unusual, F Discover Taiwan, A Mailbag Time; **0345** M-F Let's Learn Chinese (M/W/F elementary, T/H intermediate).

VOICE OF AMERICA, Africa Service - 5855, 6080, 7105, 7275, 7290, 9575, 9885

0300 S/A News & Reports, M-F Daybreak Africa (morning newsmagazine); **0323** S/A Sports; **0330** D News Headlines; **0333** S Issues in the News, M-F Business Report, A Our World (ecology, science & technology); **0345** M-F Dateline (documentary); **0355** M-F Government Editorial.

VOICE OF RUSSIA

0300 D News; **0311** S/M/H Moscow Mailbag, T/F Science & Engineering, W/A Newmarket (business); **0330** D News in Brief; **0332** S Songs from Russia, M This is Russia, T Kaleidoscope (Russian events), W Musical Portraits, H Moscow Yesterday & Today, F Russian by Radio, A Audio Book Club (Russian lit.); **0346** S You Write to Moscow; **0354** W Russia: People & Events.

WBCQ, Maine

7415 kHz.: **0300** S Pocket Calculator (about small electronic devices), M Radio New York International (cont'd).

KWHR, Hawaii

17510 kHz.: **0300** M DXing with Cumbre.

WHRA, Maine

7580 kHz.: **0330** S DXing with Cumbre.

WHRI, Indiana

5745 kHz.: **0330** M DXing with Cumbre.

WWCR, Tennessee

5070 kHz.: **0330** S World of Radio.

RADIO BUDAPEST

0330 D News; **0335** S Insight Central Europe; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine); **0350** A DX Corner.

RADIO SWEDEN

0330 S Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); **0345** T Sports Scan, W Close Up (profiles of Swedes-1st/3rd), F Nordic Report (1st)/Green Scan (ecology-2nd)/

Shortwave Guide



Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newswave.

VOICE OF VIETNAM

0330 D News; **0335** D Current Affairs; **0340** Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; **0345** T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; **0350** S Music, A Literature and Arts.

0400 UTC / 11pm E / 8pm P - Page 45 Freqs

BBC WORLD SERVICE (am) - 5975, 6135

0400 S/M The World Today, T-A News; **0405** T Jazzmatazz, W Charlie Gillett (world music), H John Peel (edective), F Composer of the Month, A Brain of Britain; **0430** S Global Business, M Westway Omnibus (drama serial), T A History of Political Thought, W Write On (letters), H Heart & Soul (spiritual matters), F Who On Earth Are We? (cultures), A Patterns of Faith; **0445** T-A Off the Shelf (book readings).

BBC WORLD SERVICE (me) - 12095, 15575

0400 D The World Today; **0430** S In Praise of God, A At the Edge of Asia or Assignment; **0450** M-F Sports Roundup.

BBC WORLD SERVICE (waf) - 6005, 7160, 11765

0400 D The World Today; **0430** S African Perspective, M-F Network Africa, A African Quiz or This Week And Africa.

BBC WORLD SERVICE (sas) - 15310, 17790, 21830

0400 S The World Today, M-A News; **0405** M Talking Point, T-A Outlook; **0430** S In Praise of God; **0445** M-F Off the Shelf (book readings), A Patterns of Faith.

BBC WORLD SERVICE (eas) - 15280, 17760, 21660

0400 D The World Today; **0430** S Global Business, A At the Edge of Asia or Assignment; **0450** M-F Sports Roundup.

CHANNEL AFRICA

0400 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

CHINA RADIO INTERNATIONAL

0400 D News; **0410** S Report on Developing Countries, M-F Special Reports, A Global Review; **0420** S In the Spotlight (cultural magazine), A Listeners' Garden; **0430** M People in the Know (China's leading personalities), T Biz China, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCB, Ecuador

0400 S Ham Radio Today, M Hour of Decision, T-A A New Beginning; **0415** T-A Reaching Your World; **0430** S Studio 9 Weekend, M Renewing Your Mind, T-A Insight for Living; **0458** T-A Money Minute.

RADIO AUSTRALIA

0400 D News; **0405** S/A Pacific Focus (S arts, A environment); **0410** M-F Margaret Throsby (interviews and music); **0430** S RA Arts, A The Buzz (technology issues).

[Special service: **0405** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA

0400 D International News; **0410** M From Habana (Cuban musicians), T-S National News; **0415** T-S Reports and music; **0430** M The Jazz Place or Top Tens, T-S News Bulletin; **0435** S World of Stamps, T-A Reports and music; **0450** S Cuban music.

RADIO NETHERLANDS

0430 S/M News; T-A Newline; **0435** S Europe Unzipped, M Sincerely Yours (letters); **0455** S Insight (commentary), M The Week Ahead (program previews).

RADIO NEW ZEALAND INTERNATIONAL

0400 S/RNZ News, M-F Checkpoint (major domestic evening news magazine); **0410** S Religion feature or series, A Musical Chairs (cont'd.); **0440** S Jazz Spotlight.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

0400 S CounterSpin (media analysis), M A Public Affair, T-A Democracy Now!; **0430** S Freespeech Radio News (repeat of Fri. newscast).

RADIO PRAGUE

0400 D News; **0405** S Magazine (local color), M Letter from Prague, T-A Newswave; **0410** S Saturday Music (a mix), M Mailbox, T One on One (interview), W

Witness (oral history), H ABC of Czech (language), F Economic Report, A The Arts; **0420** M Readings from Czech Literature, W Talking Point (Czech issues), H Czechs in History or Spotlight (travelogue), A Away from Politics (poetry).

RADIO ROMANIA INTERNATIONAL

0400 D Radio Newsreel; **0410** S The Week, M Focus, T-A Commentary; **0415** S World of Culture, M Sunday Studio, T Pro Memoria (history), W Business Club, H Society Today, F Cards on the Table (debate) or The Romanian Next to You (interview), A Challenge for the Future or Terra 2001; **0420** S RRI Encyclopedia, T Political Flash, W European Horizons; **0425** S Roots (culture/traditions), M Romanian by Radio, T/H/A Business Update, W Tourist News, F Listeners' Letterbox; **0430** S Radio Pictures, M Romanian Itineraries, T Pulse of Transition, W Mother Nature (ecology), H Visit Romania, A Practical Guide; **0435** S Romanian Itineraries, M Listeners' Letterbox, T Performing Arts, W Youth Club, H Partners in a Changing World, A Cultural Survey; **0440** S, Bucharest Along the Centuries, T Pages of Romanian Literature, W/F Skylark (folk music), H Stage and Screen, A Spectator (voice of the people); **0445** S DX Mailbag, T Romanian Hits, H Romanian Musicians, A Romanian Folk Music At Its Best; **0450** M Romanian Folk Music At Its Best, T Sports Roundup, W Athlete of the Week, H Sports Club, F Football Flash, A Sports Weekend.

RADIO UKRAINE INTERNATIONAL

0400 D News; **0410** S Ukrainian Diary (weekly review), M Music from Ukraine, T-A Ukraine Today (magazine); **0415** S The Whole World on the Radio Dial (DX program); **0430** S Hello From Kiev (listener letters/music), M Roots (culture & education); **0445** T-A Closeup (current issues).

RV, Belgium

0400 S Music from Flanders, M Radio World, T-A News; **0404** T-A Flanders Today (incl. press review); **0408** M Tourism in Flanders; **0413** T Focus on Europe, W Green Society (ecology), H/A Around the Arts, F Economics; **0414** M Brussels 1043 (letters); **0418** T Sports, H Around Town, F International Report, A Tourism in Flanders; **0424** M-A Soundbox (Flemish music).

VOICE OF AMERICA, Africa Service - 4960, 5855, 6080, 7105, 7275, 7290, 9575, 9885

0400 D News & Reports; **0415** M-F Focus (a topic in-depth); **0423** D Sports; **0430** S/A News Headlines, M-F Daybreak Africa (morning newsmagazine); **0433** S Main Street (about America, incl. Kim Elliott media report), A Press Conference USA.

VOICE OF RUSSIA

0400 D News; **0411** M Sunday Panorama, T-S News & Views; **0424** M Russia: People & Events; **0430** D News in Brief; **0432** S Kaleidoscope (Russian events), M Audio Book Club (Russian lit.), T/H/A 20th Century, W/F Russian history/culture.

WBCQ, Maine

7415 kHz.: **0400** S You Are What You Think, M Radio New York International (cont'd).

WHRI, Indiana

7315 kHz.: **0430** M DXing with Cumbre.

WWCR Tennessee

3215 kHz.: **0405** A The Golden Age of Radio Theatre.
5070 kHz.: **0400** S Spectrum (communications discussion).

0500 UTC / 12am E / 9pm P - Page 45 Freqs

BBC WORLD SERVICE (am) - 6135

0500 S News, M-A The World Today; **0505** S Wright Around the World (music requests); **0530** A World Business Review; **0545** A Letter from America (Alistair Cooke).

BBC WORLD SERVICE (eu) - 6195, 9410

0500 D The World Today; **0530** S Network Europe, A Pick of the World (BBC's best).

BBC WORLD SERVICE (wcaf) - 7160, 11765

0500 D The World Today; **0530** S Arbeat, M-F Network Africa, A Talkabout Africa.

BBC WORLD SERVICE (sas) - 15310, 17790

0500 S The World Today, M-A News; **0505** M Meridian-Masterpiece, T Meridian-Screen, W Meridian Writing, H The Music Biz, F Arts in Action, A Wright Around the World (music requests); **0530** S Music Review, M Charlie Gillett (world music), T UK Top 20, W Revolver (musician's choice), H John Peel (edective), F Jazzmatazz.

BBC WORLD SERVICE (eas) - 11955, 15360, 17760, 21660

0500 D The World Today; **0530** S/A World Learning, M A History of Political Thought, T Write On (letters), W Heart and Soul (spiritual matters), H Who on

Earth Are We? (cultures), F What's the Problem? (advice); **0545** M-F Off the Shelf (readings).

CHANNEL AFRICA

0500 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

CHINA RADIO INTERNATIONAL

0500 D News; **0510** S Report on Developing Countries, M-F Special Reports, A Global Review; **0520** S In the Spotlight (cultural magazine), A Listeners' Garden; **0530** M People in the Know (China's leading personalities), T Biz China, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

DEUTSCHE WELLE

0500 D News; **0505** S Talking Point (journalists), M Religion & Society, T-A Newlink (European current affairs); **0515** S Money Talks, M COOL! (youth magazine); **0530** T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCB, Ecuador

0500 S Studio 9 Weekend (continues), M The Sower, T-A Back to the Bible; **0515** M The Word Today, T-A The Gospel Truth; **0530** S Did You Hear?, M Let My People Think, T-A Family Life Today; **0545** S Specialized English.

RADIO AUSTRALIA

0500 D News; **0505** S/A Pacific Focus (S business, A sport); **0510** M-F Pacific Beat (Pacific islands magazine with regional sports report @ **0530**); **0530** S Fine Music Australia (classical), A Lingua Franca (about language); **0545** A Business Weekend.
[Special service: **0505** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA

0500 D International News; **0510** M Weekly Review, T-S National News; **0515** T-S Viewpoint; **0530** M Reports & Music, T-S News Bulletin; **0535** T-A Time Out (sports); **0540** S/W DXers Unlimited, M Mailbag Show, T/H/F Caribbean Outlook, A Weekly Review; **0550** M Breakthrough (science report).

RADIO JAPAN - NHK WORLD

0500 D News; **0510** S Pop Joins the World, A Hello from Tokyo (listener contact); **0515** M-F 44 Minutes (magazine).

RADIO NETHERLANDS

0500 S Amsterdam Forum (conversations), M Dutch Horizons, T Research File (science), W Music 52-15 (international music), H Documentary, F The Sound Fountain (ideas), A A Good Life (development issues).

RADIO NEW ZEALAND INTERNATIONAL

0500 D RNZ News; **0507** S Whenua (Maori magazine), M-F What's Going On? (arts & entertainment), A Tagata o te Moana (Pacific magazine); **0530** M-F Worldwatch (international news) **0545** M-F Pacific News.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

0500 S TUC Radio, M Neumaier Report, T Between the Lines, W A Woman's Voice, H Alternative Radio, F Making Contact, A Honoring Mother Earth: Indigenous Voices; **0515** M Living Enrichment Center; **0530** S Continent of Media, T TUC Radio, F Steppin' Out of Babylon.

VOICE OF AMERICA, Africa Service - 5970, 6035, 6080, 7195

0500 S News, M-A News & Reports; **0506** S Best of Talk to America; **0523** M-A Sports; **0530** D News Headlines; **0533** S Best of Talk to America, M-F Business Report, A VOA News Review; **0545** M-F Dateline (documentary); **0555** M-F Government Editorial.

VOICE OF NIGERIA

0500 S Reflections, M-F Wave Train (music), A African Safari (music); **0505** S Link-Up (music requests); **0530** S/A News, M-F VON Scope (news magazine).

VOICE OF RUSSIA

0500 D News; **0511** S/M Musical Portraits, T/F Moscow Mailbag, W/A Science and Engineering, H Newmarket (business); **0530** D News in Brief; **0532** S/A Timelines, M Jazz Show, T Music Around Us, W Moscow Yesterday and Today, H Folk Box, F Audio Book Club (Russian lit.); **0547** T Music At Your Request.

WBCQ, Maine

7415 kHz.: **0500** S Tom & Darryl (electronic media), M-A Amos 'n Andy; **0515** M World of Radio, T-F EVM Jewish Radio Network; **0545** M Radio D.C.

WHRA, Maine

7580 kHz.: **0530** A DXing with Cumbre.

Shortwave Guide



WWCR, Tennessee

5070 kHz.: **0500** S Cyber Line (digital communications).

0600 UTC / 1am E / 10pm P - Page 46 Freqs

BBC WORLD SERVICE (eu)(me) - 6195, 9410, 12095

0600 D The World Today; **0630** S Agenda (trends), A People and Politics.

BBC WORLD SERVICE (wcaf) - 6005, 7160, 11765

0600 D World Briefing; **0620** D Sports Roundup; **0630** S Agenda (trends), M-F Network Africa, A African Quiz or This Week And Africa.

BBC WORLD SERVICE (eas) - 11955, 15360, 21660

0600 S/A The World Today, M-F News; **0605** M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Writing, F The Music Biz; **0630** S Westway Omnibus, M Jazzmatazz, T Charlie Gillett (world music), W UK Top 20, H Revolver (musician's choice), F John Peel (eclectic), A People and Politics.

BBC WORLD SERVICE (sas) - 15310, 17790

0600 S/A The World Today, M-F News; **0605** M One Planet (ecology), T Science in Action, W Health Matters, H Go Digital, F Discovery (science); **0630** S Westway Omnibus, M Heritage or Documentary, F Documentary, W Everywoman, H Omnibus (documentary), F Sports International, A People and Politics.

CHANNEL AFRICA

0600 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

RADIO AUSTRALIA

0600 D News; **0605** S The Europeans, A Feedback (letters/station news/on communications); **0610** M-F Regional Sports Report; **0620** M-F Pacific Focus (M business, T health, W environment, H sport, F culture); **0630** A Oz Sounds (new releases); **0635** S Ockham's Razor (science issues); **0640** M Oz Music Show (rock), T Music Deli (diverse world/folk), W Blacktracker (contemporary Aboriginal music), H Australian Country Style, F Jazz Notes.

[Special service: **0605** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA

0600 D International News; **0610** M From Habana (Cuban musicians), T-S National News; **0615** T-S Reports and music; **0630** M The Jazz Place or Top Tens, T-S News Bulletin; **0635** S World of Stamps, T-A Reports and music; **0650** S Cuban music.

RADIO JAPAN - NHK WORLD

0600 D News; **0610** S Weekend Square (Japanese life), A Pop Joins the World; **0615** M-F Asian Top News (headlines from region's radio); **0625** M Japan Music Log, T Let's Learn Japanese, W Japan Music Treasure Box, H Brush Up Your Japanese, F Music Beat.

RADIO NEW ZEALAND INTERNATIONAL

0600 D RNZ News; **0605** S One in Five (disability issues), M Eureka (science), T-H Today in Parliament, F Country Life, A Saturday Night (variety); **0630** M Health or Environment Matters, T Digital Life, W Musical Chairs (artist feature), H Bookmarks; **0635** S The Week in Parliament.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

0600 S World of Radio, M Spiritual Awakening, T-A Freespeech Radio News (Pacific Reporters Against Censorship daily newscast); **0630** S RFPI Mailbag, M World of Radio, T/H/A Hightower Radio (commentary), W Counterspin (media analysis), F This Way Out (lesbian/gay magazine); **0635** T/H/A Earthwatch (ecology); **0640** T/H/A Earth & Sky (astronomy); **0645** T Tropical Conservation Newsbureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

VOICE OF AMERICA, Africa Service - 5970, 6035, 6080, 7195

0600 S/A News & Reports, M-F Daybreak Africa (morning newsmagazine); **0623** S/A Sports; **0630** S/A News Headlines; **0633** S Main Street (about America, incl. Kim Elliott media report), A On the Line (US foreign policy).

VOICE OF NIGERIA

0600 S This Week on VON, M Across the Ages, T Agenda for Peace, W Nigerian Newsletter, H West African Scene, F African Writers, A From the Racks; **0615** S Listeners' Letters, M Nigeria & Politics, T Nigerian Scene, W Wheel of Progress, H World of the Arts, F Images of Nigeria, A Issues of the Moment; **0630** S/A Weekly Analysis, M-F World News; **0640** M-F Commentary & Press Review; **0645** M-F News about Nigeria.

KWHR, Hawaii

17780 kHz.: **0600** A DXing with Cumbre.

WBCQ, Maine

7415 kHz.: **0600** S Juliet's Wild Kingdom, M Radio D.C. (cont'd), T-F EVM Jewish Radio Network (cont'd).

WHRI, Indiana

5745 kHz.: **0600** A DXing with Cumbre.
7315 kHz.: **0600** A DXing with Cumbre.

1000 UTC / 5am E / 2am P - Page 48 Freqs

BBC WORLD SERVICE (am) - 6195 (+15190 S/A)

1000 S/A World Briefing, M-F World Update; **1020** S/A Sports Roundup; **1030** S Reporting Religion, A Agenda.

BBC WORLD SERVICE (eas) - 6195, 9740, 15360

1000 S/A News, M-F World Update; **1001** S Concert Hall; **1005** A Composer of the Month; **1030** M-F World Business Report, A Music Review; **1045** M-F Sports Roundup.

RADIO AUSTRALIA

1000 D News; **1005** S The Buzz (technology issues), M-F Asia Pacific (regional current affairs), A Pacific Review; **1030** S Rural Reporter, M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A Educational series.

RADIO NEW ZEALAND INTERNATIONAL

1000 D RNZ News; **1005** S Nightcap, M Jazz Profiles, T/A Music 'til Midnight, W In a Mellow Tone, H Beale Street Caravan (blues music), F The Mix (new music).

VOICE OF AMERICA (News Now)

1000 D News and Reports; **1023** D Sports; **1030** D News Headlines; **1033** S-H Main Street (life in the US), F/A On the Line (US foreign policy); **1055** A Government Editorial.

KWHR, Hawaii

11565 kHz.: **1000** A DXing with Cumbre.

WWCR, Tennessee

3210 kHz.: **1000** S World Wide Country Radio (country music).
9475 kHz.: **1030** M The Old Record Shop (vintage recordings), W World of Radio; **1045** F Ask WWCR (letters).

1100 UTC / 6am E / 3am P - Page 48 Freqs

BBC WORLD SERVICE (am) - 6195, 15190

1100 D World Briefing; **1105** M-F Caribbean Morning Report; **1110** M-F Sports Caribbean; **1115** M-F Caribbean Magazine; **1120** D British News; **1130** S At the Edge of Asia or Assignment, M-F World Business Report, A World Business Review; **1145** M-H, A Sports Roundup, F Football Extra.

BBC WORLD SERVICE (eu) - 12095, 15485

1100 D World Briefing; **1120** D British News; **1130** S Network Europe, M-F World Business Report, A Analysis or The New Europe; **1145** M-H/A Sports Roundup, F Football Extra.

BBC WORLD SERVICE (me) - 15565, 17640

1100 D World Briefing; **1120** S British News; **1130** S/A World Learning, M-F World Business Report.

BBC WORLD SERVICE (wcaf) - 17830

1100 D World Briefing; **1120** D British News; **1130** S Postmark Africa, M-F World Business Report, A Inside Track (African sport); **1145** M-H Sports Roundup, F Football Extra.

BBC WORLD SERVICE (eas) - 6195, 9740, 15360

1100 S/A World Briefing, M-F News; **1105** M Health Matters, T Go Digital, W Discovery (science), H One Planet (ecology), F Science in Action; **1120** S/A British News; **1130** S Play of the Week, M Everywoman, T Omnibus (documentary), W Sports International, H Heritage or Documentary, F Documentary, A Analysis; **1145** A Sports Roundup.

BBC WORLD SERVICE (sas) - 15310, 17700

1100 S News, M-A World Briefing; **1101** S Concert Hall; **1120** M-A British News; **1130** M-F World Business Report, A Analysis; **1145** M-H/A Sports Roundup, F Football Extra.

HCIB, Ecuador

1100 S Let My People Think, M-F Insight for Living, A We Kids; **1128** M-F Money Minute; **1130** S Encounter, M-F Morning in the Mountains (Christian breakfast show w/News **1130**, Overcomers **1133**, Listen to the Bible **1140**, Beyond the Call **1145**), A Down Gilead Lane.

RADIO AUSTRALIA

1100 D News; **1105** S Correspondents' Report, M-A Asia Pacific (regional current affairs); **1130** S Business Report, M-F Regional Sports Report, A Fine Music Australia (classical); **1135** M-F Bush Telegraph (rural life).

RADIO JAPAN - NHK WORLD

1100 D News; **1110** S Hello from Tokyo (listener contact), A Pop Joins the World; **1115** M-F Asian Top News (headlines from region's radio); **1125** M Japan Music Log, T Let's Learn Japanese, W Japan Music Treasure Box, H Brush Up Your Japanese, F Music Beat.

RADIO KOREA INTERNATIONAL

1130 D News; **1140** S Korean Pop Interactive (requests), M-F News Commentary, A Friendship Unlimited (letters, DX news); **1145** M-F Seoul Calling (magazine).

RADIO NETHERLANDS

1130 S/A News, M-F Newline; **1135** S Wide Angle (week in review), A Europe Unzipped; **1155** S The Week Ahead (program previews), A Insight (commentary).

RADIO NEW ZEALAND INTERNATIONAL

1100 D RNZ News; **1105** S/A Forces Radio (for NZ personnel serving in PNG & E. Timor), M-H Nine to Noon (current affairs), F Sports Story; **1130** F Top 5.

WWCR, Tennessee

5070 kHz.: **1100** A Left Behind; **1110** S A View from Europe.
15825 kHz.: **1115** S Ask WWCR (letters).

1200 UTC / 7am E / 4am P - Page 49 Freqs

BBC WORLD SERVICE (am) - 6195, 15190

1200 D Newshour; **1205** M-F Caribbean Business; **1210** M-F Caribbean Morning Report; **1215** M-F Newshour (cont'd).

BBC WORLD SERVICE (eu)(wcaf) - 12095, 15485, 17830

1200 D Newshour.

BBC WORLD SERVICE (me) - 15565, 15575, 17640

1200 D News; **1205** S People & Politics, M Arts in Action, T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Writing, F The Music Biz, A Wright Around the World (music requests); **1230** S Reporting Religion, M Jazzmatazz, T Charlie Gillett (world music), W UK Top 20, H Revolver (musician's choice), F John Peel (eclectic).

BBC WORLD SERVICE (easf) - 21470

1200 D News; **1201** S Concert Hall; **1205** M-F Outlook (magazine), A Composer of the Month; **1230** A Music Review; **1245** M Write On (letters), T Heart and Soul (spiritual matters), W/F Westway (drama serial), H What's the Problem? (advice).

BBC WORLD SERVICE (eas) - 6195, 9740, 15360

1200 S Play of the Week (cont'd. from **1130**), M-A News; **1205** M-F Outlook (magazine), A Brain of Britain; **1230** S At the Edge of Asia or Assignment, A Pick of the World (BBC's best); **1245** M Write On (letters), T Heart and Soul (spiritual matters), W/F Westway (drama serial), H What's the Problem? (advice).

BBC WORLD SERVICE (sas) - 15310, 17700

1200 D News; **1205** S Write Around the World (music requests), M-F Outlook (magazine), A Composer of the Month; **1230** A Music Review; **1245** M Write On (letters), T Heart and Soul, W/F Westway (drama serial), H What's the Problem? (advice).

HCIB, Ecuador

1200 S Moody Presents, M-F Morning in the Mountains (cont'd. from **1130** w/News **1200**); **1230**, Insights **1205**, Sports **1206**, Mission Network News **1220**, Guidelines for Living **1233**, A Adventures in Odyssey; **1230** S The Living Word, A Toonz!

RADIO AUSTRALIA

1200 D News; **1205** S Nocturne (night music), M-H Late Night Live (discussion and interviews), F Sound Quality (innovative music), A The Spirit of Things (spiritual matters).

RADIO KOREA INTERNATIONAL

1200 S Korean Pop Interactive (cont'd), M Korea Today & Tomorrow, T Cultural Promenade, W Economic Radar, H Korea & Its Splendors, F Notes of Nostalgia (traditional music), A Friendship Unlimited (cont'd).

RADIO NETHERLANDS

1200 S The Sound Fountain (ideas), M EuroQuest (Europe in context), T A Good Life

Shortwave Guide



(development issues), W Dutch Horizons, H Research File (science), F Documentary, A Amsterdam Forum (conversations); **1230 S** Dutch Horizons, M Research File, T/A Music 52-15 (international music), W Documentary, H The Sound Fountain, F A Good Life.

RADIO NEW ZEALAND INTERNATIONAL

120 S-F RNZ News, A Forces Radio (cont'd.); **1205 S** Sportsworld (recap magazine), M-F Late Edition.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1200 S World of Radio, M Spiritual Awakening, T-A Freespeech Radio News (Pacific Reporters Against Censorship daily newscast); **1230 S** RFI Mailbag, M World of Radio, T/H/A Hightower Radio (commentary), W Counterspin (media analysis), F This Way Out (lesbian/gay magazine); **1235 T** H/A Earthwatch (ecology); **1240 T** H/A Earth & Sky (astronomy); **1245 T** Tropical Conservation Newsbureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

RADIO SWEDEN

1230 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report), A Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); **1245 M** Sports Scan, T Close Up (profiles of Swedes-1st/3rd), H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WWCR, Tennessee

5070 kHz.: **1200 S** Profiles; **1205 A** Rock the Universe (Christian rock music). 15825 kHz.: **1210 A** A View from Europe.

1300 UTC / 8am E / 5am P - Page 49 Freqs

BBC WORLD SERVICE (am) - 6195, 15190

1300 D News; **1305 S** Composer of the Month, M-F Outlook (magazine), A World Football; **1330 S** In Praise of God, A The Music Feature; **1345 M-F** Off the Shelf (book readings).

BBC WORLD SERVICE (eu) - 12095, 15485

1300 D News; **1305 S** Brain of Britain, M-F Outlook (magazine), A Wright Around the World (music requests); **1330 S** Pick of the World (BBC's best); **1345 M** Write On (letters), T Heart and Soul (spiritual matters), W/F Westway (drama serial), H What's the Problem? (advice).

BBC WORLD SERVICE (me)(esaf) - 15565, 15575, 17640, 17830

1300 D Newshour.

BBC WORLD SERVICE (wcaf) - 17830

1300 D News; **1301 S** Concert Hall; **1305 M** Arts in Action, T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Writing, F The Music Biz, A Composer of the Month; **1330 M** Jazzmatazz, T Charlie Gillett (world music), W UK Top 20, H Revolver (musician's choice), F John Peel (eclectic), A Music Review.

BBC WORLD SERVICE (eas)(sas) - 6195, 9740, 15310, 15360, 17700

1300 D Newshour; **1350 M-F** World Business Report.

CHANNEL AFRICA

1300 S/A Channel Africa Extra (weekend variety magazine).

CHINA RADIO INTERNATIONAL

1300 D News; **1310 S** Report on Developing Countries, M-F Special Reports, A Global Review; **1320 S** In the Spotlight (cultural magazine), A Listeners' Garden; **1330 M** People in the Know (China's leading personalities), T Biz China, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCJB, Ecuador

1300 S Viewpoint, M-F Precept, A Toon! (continued); **1313 M-F** Getting the Message; **1315 M-F** Proclaim!; **1330 S** Mountain Meditations, M-F Family Life Today, A Studio 9 Weekend.

RADIO AUSTRALIA

1305 S Nocturne (cont'd.), A The Science Show; **1310 M-F** Regional Sports Report; **1315 M-F** Dust & Dollars (stock market report); **1320 M-F** The Planet (diverse music from around the world).

RADIO CANADA INTERNATIONAL

1300 M-F News; **1305 M-F** The Current (current affairs-joined in progress).

RADIO NETHERLANDS

1300 S/A News, M-F Newslines; **1305 S** Sincerely Yours (letters), A Europe Unzipped.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1300 S Making Contact, M RadioNation ("The Nation" magazine), T Disability Radio Worldwide, W World of Radio, H A Public Affair, F Far Right Radio Review, A Continent of Media; **1330 S** Alternative Radio (political/social analysis), T This Way Out (lesbian/gay magazine), W RFI Mailbag, A World of Radio.

WHRI, Indiana

9840 kHz.: **1300 A** DXing with Cumbre.
15105 kHz.: **1330 A** DXing with Cumbre.

WWCR, Tennessee

5070 kHz.: **1305 S** Rock the Universe (Christian rock music).
15825 kHz.: **1330 T** Musical Memories.

RADIO SWEDEN

1330 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report), A Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); **1345 M** Sports Scan, T Close Up (profiles of Swedes-1st/3rd), H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

1400 UTC / 9am E / 6am P - Page 49 Freqs

BBC WORLD SERVICE (am)(sas) - 15190, 15310, 17790

1400 D News; **1405 S** Talking Point (global phone-in), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Writing, H The Music Biz, F Arts in Action, A Sportsworld (live action); **1430 M** Charlie Gillett (world music), T UK Top 20, W Revolver (musician's choice), H John Peel (eclectic), F Jazzmatazz.

BBC WORLD SERVICE (eu) - 12095, 15485

1400 D News; **1405 S** Talking Point (global phone-in), M Arts in Action, T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Writing, F The Music Biz, A Sportsworld (live action); **1430 M** Jazzmatazz, T Charlie Gillett (world music), W UK Top 20, H Revolver (musician's choice), F John Peel (eclectic).

BBC WORLD SERVICE (me)(wcaf) - 15565, 17640, 17830

1400 D News; **1405 S** Talking Point (global phone-in), M Science in Action, T Health Matters, W Go Digital, H Discovery (science), F One Planet (ecology), A Sportsworld (live action); **1430 M** Documentary, T Everywoman, W Omnibus (documentary), H Sports International, F Heritage or Assignment.

BBC WORLD SERVICE (esaf) - 21470, 21660

1400 S/A News, M-F World Briefing; **1405 S** Talking Point (global phone-in), A Sportsworld (live action); **1415 M-F** World Business Report; **1430 M-F** British News; **1445 M-H** Sports Roundup, F Football Extra.

BBC WORLD SERVICE (eas) - 6135, 6195, 9740

1400 S/A News, M-F East Asia Today; **1405 S** Talking Point (global phone-in), A Sportsworld (live action); **1430 M-F** British News; **1445 M-H** Sports Roundup, F Football Extra.

CHANNEL AFRICA

1400 S/A Channel Africa Extra (cont'd from 1300).

CHINA RADIO INTERNATIONAL

1400 D News; **1410 S** Report on Developing Countries, M-F Special Reports, A Global Review; **1420 S** In the Spotlight (cultural magazine), A Listeners' Garden; **1430 M** People in the Know (China's leading personalities), T Biz China, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCJB, Ecuador

1400 S Renewing Your Mind, M-F Haven, A Studio 9 Weekend (continued).

RADIO AUSTRALIA

1400 D News; **1405 S** Books & Writing, M-F The Planet (cont'd.), A New Dimensions ("progressive" ideas).

RADIO CANADA INTERNATIONAL

1400 D News; **1405 S** The Sunday Edition, M-F Sounds Like Canada (Canadian magazine including **1430 W** C'est La Vie (life in French Canada)); A The House (Canadian politics)

RADIO JAPAN - NHK WORLD

1400 D News; **1410 S** Pop Joins the World, A Weekend Square (Japanese life); **1415 M-F** 44 Minutes (feature magazine).

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1400 S Alternative Radio (cont'd), M New Dimensions ("progressive" ideas), T

University Forum (interviews), W Continent of Media, H WINGS (women's news), F Disability Radio Worldwide, A RFI Mailbag; **1430 S** Far Right Radio Review, T Honoring Mother Earth: Indigenous Voices, W A World of Possibilities, H Global Community Forum (interviews), F A Woman's Voice, A University Forum (interviews).

RADIO PRAGUE

1400 D News; **1405 S** Letter from Prague, M-F Newslines, A Insight Central Europe; **1410 S** Mailbox, M One on One (interview), T Witness (oral history), W ABC of Czech (language), H Economic Report, F The Arts; **1420 S** Readings from Czech Literature, T Talking Point (Czech issues), W Czechs in History or Spotlight (travelogue), F Away from Politics (poetry).

WWCR, Tennessee

15825 kHz.: **1400 M-F** World Wide Country Radio (country music), **1430 S** The Old Record Shop (vintage recordings).

RADIO NETHERLANDS

1430 S/A News, M-F Newslines; **1435 S** Sincerely Yours (letters), A Europe Unzipped; **1455 S** The Week Ahead (program previews), A Insight (commentary).

RADIO SWEDEN

1430 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report), A Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); **1445 M** Sports Scan, T Close Up (profiles of Swedes-1st/3rd), H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

1500 UTC / 10am E / 7am P - Page 50 Freqs

BBC WORLD SERVICE (am) - 15190

1500 D News; **1505 S** From Our Own Correspondent, M One Planet (ecology), T Science in Action, W Health Matters, H Go Digital, F Discovery (science), A Sportsworld (live action); **1530 S** People & Politics, M Heritage or Documentary, T Documentary, W Everywoman, H Omnibus (documentary), F Sports International.

BBC WORLD SERVICE (eu) - 9410, 12095, 15485

1500 D News; **1505 S** From Our Own Correspondent, M Science in Action, T Health Matters, W Go Digital, H Discovery (science), F One Planet (ecology), A Sportsworld (live action); **1530 S** People & Politics, M Documentary, T Everywoman, W Omnibus (documentary), H Sports International, F Heritage or Assignment.

BBC WORLD SERVICE (me) - 15565

1500 S/A News, M-F World Briefing; **1501 S** Concert Hall; **1505 A** Sportsworld; **1530 M-F** British News; **1545 M-F** Sports Roundup.

BBC WORLD SERVICE (af) - 15400, 17830, 21470, 21660

1500 D News; **1501 S** Play of the Week; **1505 M-F** Focus on Africa, A Sportsworld (live action); **1530 M** Pick of the World (BBC's best), M Write On (letters), T Heart & Soul (spiritual matters), W/F Westway (drama serial), H What's the Problem? (advice); **1545 M-F** Off the Shelf (readings).

BBC WORLD SERVICE (eas) - 6195, 9740

1500 D News; **1505 S** From Our Own Correspondent, M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Writing, H The Music Biz, F Arts in Action, A Sportsworld (live action); **1530 S** Global Business, M Charlie Gillett (world music), T UK Top 20, W Revolver (musician's choice), H John Peel (eclectic), F Jazzmatazz.

BBC WORLD SERVICE (sas) - 15310, 17700

1500 S/A News, M-F World Briefing; **1501 S** Play of the Week (radio drama); **1505 A** Sportsworld; **1530 M-F** British News; **1545 M/T/H/F** Analysis, W From Our Own Correspondent.

CHINA RADIO INTERNATIONAL

1500 D News; **1510 S** Report on Developing Countries, M-F Special Reports, A Global Review; **1520 S** In the Spotlight (cultural magazine), A Listeners' Garden; **1530 M** People in the Know (China's leading personalities), T Biz China, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

RADIO AUSTRALIA

1500 D News; **1505 S** Encounter (religion in Australia), M-F Asia Pacific (regional current affairs), A Nocturne (night music); **1530 M** Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor; **1555 S** Business Weekend.

Shortwave Guide



RADIO CANADA INTERNATIONAL

1500 D News; **1505** S The Sunday Edition (cont'd.), M-F Sounds Like Canada (cont'd., including **1505** M Workology (about working)), T-F Out Front (first person views of life), A Vinyl Cafe.

RADIO NETHERLANDS

1500 S Dutch Horizons, M Research File (science), T/A Music 52-15 (international music), W Documentary, H The Sound Fountain (ideas), F A Good Life (development issues); **1530** S The Sound Fountain, M EuroQuest (Europe in context), T A Good Life, W Dutch Horizons, H Research File, F Documentary, A Amsterdam Forum (conversations).

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1500 S Far Right Radio Review (cont'd.), M Voices of Our World (Maryknoll program), T Honoring Mother Earth: Indigenous Voices (cont'd.), W Living Enrichment Center, H Global Community Forum (cont'd.), F A Woman's Voice (cont'd.), A A World of Possibilities; **1530** S World Citizens Weekly Commentary, M Perspective (UN program), T In the Moment, W Peace Forum, H Scope (UN program), F Tropical Conservation Newshour (rainforests), A Newmaier Report; **1545** S/M Hightower Report (commentary), T-A UN Today; **1548** S/M Earthwatch (ecology); **1551** S/M Earth & Sky (astronomy); **1555** S/M World Opinion (on terrorism).

1600 UTC / 11am E / 8am P - Page 50 Freqs

BBC WORLD SERVICE (am)(eu) - 9410, 15190

1600 S/A News, M-F World Briefing; **1601** S Concert Hall; **1605** A Sportsworld (live action); **1620** M-F British News; **1630** M/T/H Analysis, W From Our Own Correspondent, F Analysis or The New Europe (4th wk); **1645** M-F Sports Roundup.

BBC WORLD SERVICE (me) - 12095, 15565

1600 S World Briefing, M-A News; **1605** M-F Outlook (magazine), A Sportsworld (live action); **1620** S British News; **1630** S Patterns of Faith; **1645** S Sports Roundup, M Write On (letters), T Heart and Soul (spiritual matters), W/F Westway (drama serial), H What's the Problem? (advice).

BBC WORLD SERVICE (af) - 15400, 15420, 17830, 21470, 21660

1600 S World Briefing, M-A News; **1605** M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Writing, H The Music Biz, F Arts in Action, A Sportsworld (live action); **1620** S British News; **1630** S Patterns of Faith (exc. From Our Own Correspondent on 15400, 17830), M/F Fast Track (African sport), T African Perspective, W Talkabout Africa, H Artbeat; **1645** S Sports Roundup.

BBC WORLD SERVICE (sas) - 15310, 17700

1600 S World Briefing, M-A News; **1605** M Health Matters, T Go Digital, W Discovery (science), H One Planet (ecology), F Science in Action, A Sportsworld (live action); **1620** S British News; **1630** S Patterns of Faith, M Everywoman, T Omnibus (documentary), W Sports International, H Heritage or Assignment, F Documentary; **1645** S Sports Roundup.

HCJB, Ecuador

1600 S Message of Truth, M-F Renewing Your Mind, A Words of Hope.

RADIO AUSTRALIA

1600 D News; **1605** S The National Interest (Australian politics), M Margaret Throsby (interview and music), T The Comfort Zone (Australian homes/gardens/food), W Verbatim (oral histories), H Hindsight (Australian history), F AWAYE! (Aboriginal culture), A Nocturne (cont'd.); **1630** W Street Stories (everyday life).

RADIO CANADA INTERNATIONAL

1600 S/A News; **1605** S The Sunday Edition (cont'd.), A Quirks and Quarks (science).

RADIO NETHERLANDS

1600 S/A News, M-F Newline; **1605** S Wide Angle (one issue focus), A Europe Unzipped.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1600 S A Public Affair, M-F Democracy Now!, A CounterSpin (media analysis); **1630** A Freespeech Radio News (repeat of Fri. newscast).

VOICE OF AMERICA, Africa Service - 13710, 15225, 15410, 17810

1600 S/A Nightline Africa (weekend newsmagazine), M-F News & Reports; **1615** M-F Focus (a topic in-depth); **1623** M-F Sports; **1630** M-F Africa World Tonight.

RADIO OSTERREICH INTERNATIONAL

1630 S Letter from Austria, M-F Report from Austria (magazine), A Insight Central Europe; **1635** S Network Europe; **1650** A Postbox.

KWHR, Hawaii

9930 kHz.: **1600** A DXing with Cumbre.

WHRI, Indiana

13760 kHz.: **1600** A DXing with Cumbre.

WWCR, Tennessee

12160 kHz.: **1605** S America's Greatest Heroes.

1700 UTC / 12pm E / 9am P - Page 51 Freqs

BBC WORLD SERVICE (eu) - 9410

1700 S News, M-F Europe Today, A World Briefing; **1705** S Sportsworld (live action); **1720** A British News; **1730** M-F World Business Report, A Sportsworld; **1745** M-F Sports Roundup.

BBC WORLD SERVICE (me) - 15565

1700 S-F News, A World Briefing; **1705** S Sportsworld (live action), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Writing, H The Music Biz, F Arts in Action; **1720** A British News; **1730** M Charlie Gillett (world music), T UK Top 20, W Revolver (musician's choice H John Peel (eclectic), A Sportsworld (live action).

BBC WORLD SERVICE (af) - 15400, 17830, 21470

1700 D News; **1705** D Focus on Africa; **1745** S/A Sportsworld (live action), M-F Sports Roundup.

RADIO AUSTRALIA

1700 S News; **1705** S The Spirit of Things (spiritual matters), M-F Bush Telegraph (rural life), A New Dimensions ("progressive" ideas).

RADIO JAPAN - NHK WORLD

1700 D News; **1710** S Pop Joins the World, A Hello from Tokyo (listener contact); **1715** M-F 44 Minutes (feature magazine).

RADIO OSTERREICH INTERNATIONAL

1704 S My Music with Paul Catty.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1700 S Neumaier Report, M Between the Lines, T A Woman's Voice, W Alternative Radio, H Making Contact, F Honoring Mother Earth: Indigenous Voices, A TUC Radio; **1715** S Living Enrichment Center; **1730** M TUC Radio, H Steppin' Out of Babylon, A Continent of Media.

VOICE OF AMERICA, Africa Service - 15410, 15445, 17895

1700 S Reporters' Roundtable, M-A News; **1706** M-F Talk to America (global phone-in), A Best of Talk to America; **1730** S Music Time in Africa; **1755** A Government Editorial.

WWCR, Tennessee

12160 kHz.: **1730** A Ken's Country Classics (country music).

1800 UTC / 1pm E / 10am P - Page 51 Freqs

BBC WORLD SERVICE (eu) - 9410

1800 D News; **1801** S Play of the Week (radio theatre); **1805** M-F Outlook (magazine), A At the Edge of Asia or Assignment; **1830** A Agenda (trends); **1845** M Write On (letters), T Heart and Soul (spiritual matters), W/F Westway (drama serial), H What's the Problem? (advice).

BBC WORLD SERVICE (wcaf) - 15400, 17830

1800 D World Briefing; **1820** D British News; **1830** S At the Edge of Asia or Assignment, M-F World Business Report, A World Business Review; **1845** M/T/H/F Analysis, W From Our Own Correspondent, A Letter from America (Alistair Cooke).

BBC WORLD SERVICE (esaf) - 21470

1800 S/A World Briefing, M-F News; **1805** M Health Matters, T Go Digital, W Discovery (science), H One Planet (ecology), F Science in Action; **1820** S/A British News; **1830** S At the Edge of Asia or Assignment, M Everywoman, T Omnibus (documentary), W Sports International, H Heritage or Documentary, F Documentary, A World Business Review; **1845** A Letter from America (Alistair Cooke).

RADIO AUSTRALIA

1800 D News; **1805** S-H Pacific Beat (Pacific islands magazine), F Pacific Review, A Lifelong Learning; **1830** F Educational series.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1800 S Spiritual Awakening, M Steppin' Out of Babylon, T RadioNation ("The

Nation" magazine), W Voices of Our World (Maryknoll program), H Between the Lines, F WINGS (women's news), A World of Radio; **1830** S World of Radio, M/W/F Hightower Radio (commentary), T Counterspin (media analysis), H This Way Out (lesbian/gay magazine), A RFP Mailbag; **1835** M/W/F Earthwatch (ecology); **1840** M/W/F Earth & Sky (astronomy); **1845** M Tropical Conservation Newsbureau (rainforests), W World Citizen's Weekly Commentary, F Women (UN program).

VOICE OF AMERICA, Africa Service - 15410, 15445, 15580, 17895

1800 S/A News & Reports, M-F Africa World Tonight; **1823** S/A Sports; **1830** S/A News Headlines, W Straight Talk Africa (continental phone-in); **1833** S/A On the Line (US foreign policy); **1855** S/A Government Editorial.

WWCR, Tennessee

12160 kHz.: **1815** W Ask WWCR (exc. 2nd/3rd W).
15825 kHz.: **1830** S Ask WWCR, T Dialogue.

1900 UTC / 2pm E / 11am P - Page 52 Freqs

BBC WORLD SERVICE (eu) - 9410

1900 S/A World Briefing, M-F News; **1905** M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Writing, H The Music Biz, F Arts in Action; **1920** S/A Sports Roundup, A World Business Review; **1930** S Reporting Religion, M Charlie Gillett (world music), T UK Top 20, W Revolver (musician's choice), H John Peel (eclectic), F Jazzmatazz, A World Business Review; **1945** A Letter from America (Alistair Cooke).

BBC WORLD SERVICE (wcaf) - 15400, 17830

1900 S World Briefing, M-A News; **1905** S M-F Focus on Africa, A Westway Omnibus (drama serial); **1930** S/A World Learning, M/F Fast Track (African sport), T Artbeat, W Talkabout Africa, H Postmark Africa.

BBC WORLD SERVICE (esaf) - 9630, 12095

1900 S-F News, A World Briefing; **1905** S Wright Around the World (music requests), M-F Focus on Africa; **1920** A Sports Roundup; **1930** M Charlie Gillett (world music), T UK Top 20, W Revolver (musician's choice), H John Peel (eclectic), F Jazzmatazz, A Agenda (trends).

RADIO AUSTRALIA

1900 D News; **1905** S-H Pacific Beat (cont'd.), F Pacific Focus (health), A Australia All Over (w/news 1930); **1930** F In Conversation (on science).

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1900 S RadioNation ("The Nation" magazine), M Disability Radio Worldwide, T World of Radio, W A Public Affair, H Far Right Radio Review, F Continent of Media, A Making Contact; **1930** M This Way Out (lesbian/gay magazine), T RFP Mailbag, F World of Radio, A Alternative Radio (political/social analysis).

VOICE OF AMERICA, Africa Service - 15410, 15445, 15580

1900 S News & Reports, M-F News, A Hip Hop Connections (music); **1906** M-F Border Crossings (music—exc. W Straight Talk Africa cont'd.); **1923** S Sports; **1930** S Music Time in Africa (part 2), M-F World of Music, A News Headlines; **1933** A Our World (ecology, science & technology).

WHRI, Indiana

13760 kHz.: **1900** A DXing with Cumbre.

WWCR, Tennessee

12160 kHz.: **1900** A Musical Memories.

2000 UTC / 3pm E / 12pm P - Page 52 Freqs

BBC WORLD SERVICE (eu) - 9410

2000 D News; **2005** S From Our Own Correspondent, M Health Matters, T Go Digital, W Discovery (science), H One Planet (ecology), F Science in Action, A Brain of Britain; **2030** S Global Business, M Everywoman, T Omnibus (documentary), W Sports International, H Heritage or Documentary, F Documentary, A Westway Omnibus (drama serial).

BBC WORLD SERVICE (af) - 9630, 12095, 15400, 17830

2000 D Newshour; **2050** D Sports Roundup.

RADIO AUSTRALIA

2000 D News; **2005** S-H Pacific Beat (cont'd.), F Pacific Review, A Australia All Over (cont'd.); **2030** F Country Breakfast (rural issues); **2045** A Asia Sunday.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

2000 S New Dimensions ("progressive" ideas), M University Forum (interviews), T Continent of Media, W WINGS (women's news), H Disability Radio Worldwide,

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F RFPI Mailbag, A Alternative Radio (cont'd); **2030** M Honoring Mother Earth: Indigenous Voices, T A World of Possibilities, W Global Community Forum (interviews), H A Woman's Voice, F University Forum (interviews), A Far Right Radio Review.

VOICE OF AMERICA, Africa Service - 15410, 15445, 15580, 17895
2000 S/A Nightline Africa (weekend magazine), M-F Africa World Tonight.

WHRI, Indiana
9495 kHz.: **2030** A DXing with Cumbre.

WWCR, Tennessee
12160 kHz.: **2000** A World Wide Country Radio (country music).

2100 UTC / 4pm E / 1pm P - Page 53 Freqs

BBC WORLD SERVICE (am) - 5975, 12095

2100 S/A Newshour, M-F News; **2105** M Science in Action, T Health Matters, W Go Digital, H Discovery (science), F One Planet (ecology); **2130** M Documentary, T Everywoman, W Omnibus, H Sports International, F Heritage or Documentary. [Special service to the Caribbean on 5975, 11675, 15390 kHz.: **2105** M-F Caribbean Report. Special service to the Falklands on 11680 kHz.: **2130** T/F Calling the Falklands.]

BBC WORLD SERVICE (eu) - 9410
2100 D Newshour.

BBC WORLD SERVICE (wcaf) - 15400, 17830

2100 D News; **2105** S Wright Around the World (music requests), M Health Matters, T Go Digital, W Discovery (science), H One Planet (ecology), F Science in Action, A From Our Own Correspondent; **2130** M Everywoman, T Omnibus (documentary), W Sports International, H Heritage or Documentary, F Documentary, A People and Politics.

RADIO AUSTRALIA

2100 D News; **2105** F Feedback (letters, station news, on communications), A Australia All Over (cont'd); **2110** S-H AM (morning news magazine); **2130** S Educational series, M Health Report, T Innovations (new products), W Religion Report, H Rural Reporter, F Oz Sounds (new music releases).

RADIO JAPAN - NHK WORLD

2100 D News; **2110** S Pop Joins the World, A Weekend Square; **2115** M-F Asian Top News (headlines from region's radio); **2125** M Japan Music Log, T Let's Learn Japanese, W Japan Musical Treasure Box, H Brush Up Your Japanese, F Music Beat.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

2100 S Voices of Our World (Maryknoll program), M Honoring Mother Earth: Indigenous Voices (cont'd), T Living Enrichment Center, W Global Community Forum (cont'd), H A Woman's Voice (cont'd), F A World of Possibilities, A Far Right Radio Review (cont'd); **2130** S Perspective (UN program), M In the Moment, T Peace Forum, W Scope (UN program), H Tropical Conservation Newshour (rainforests), F Neumaier Report, A World Citizens Weekly Commentary; **2145** S/A Hightower Report (commentary), M-F UN Today; **2148** S/A Earthwatch (ecology); **2151** S/A Earth & Sky (astronomy); **2155** S/A World Opinion (on terrorism).

RADIO PRAGUE

2100 D News; **2105** S Letter from Prague, M-F Current Affairs, A Readings from Czech Literature; **2110** S The Arts, A Saturday Music (classical/folk/jazz); **2115** S Mailbox, M Spotlight (Czech current events) or One on One (interview), W Czechs in History or Central Europe Today, F Magazine; **2120** T Talking Point, H Economic Report.

VOICE OF AMERICA, Africa Service - 15410, 15445, 15580, 17895

2100 D News; **2106** S/A Jazz America, M American Gold, T Roots and Branches, W Classic Rock, H Top 20, F Country Hits.

WBCQ, Maine
7415 kHz.: **2100** H-S Radio Caroline (the original Europirate radio station).

WWCR, Tennessee
15825 kHz.: **2130** T Left Behind, H World of Radio, F Ask WWCR, A Presidential Radio Address/Democratic Response.

2200 UTC / 5pm E / 2pm P - Page 54 Freqs

BBC WORLD SERVICE (am) - 5975, 12095

2200 S/A The World Today, M-F News; **2205** M-F World Business Report; **2220** M-F British News; **2230** S Agenda (trends), M-F Sports Roundup, A From Our

Own Correspondent; **2245** M/T/H/F Analysis, W From Our Own Correspondent.

BBC WORLD SERVICE (eu) - 6195 via UK

2200 D News; **2205** S At the Edge of Asia or Assignment, M-F World Business Report, A Composer of the Month; **2220** M-F British News; **2230** S Agenda (trends), M-F Sports Roundup, A Music Review; **2245** M-F Off the Shelf (book readings).

BBC WORLD SERVICE (wcaf) - 15400, 17830

2200 D News; **2205** S At the Edge of Asia or Assignment, M-F Outlook (magazine), A Brain of Britain; **2230** S Agenda (trends), A Pick of the World (BBC's best); **2245** M Write On (letters), T Heart and Soul (spiritual matters), W/F Westway (drama serial), H What's the Problem?

BBC WORLD SERVICE (eas) - 6195 via Singapore, 7105, 11685

2200 D The World Today; **2230** F People and Politics, A From Our Own Correspondent.

RADIO AUSTRALIA

2200 D News; **2205** F Asia Pacific (regional current affairs), A Correspondents' Report; **2210** S-H AM (morning news magazine); **2230** F AM (morning news magazine), A Business Report; **2240** S Australian Music Show (rock), M Music Deli (international), T Blacktracker (Aboriginal contemporary music), W Country Style, H Jazz Notes.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

2200 S A Public Affair, M-F Democracy Now!, A CounterSpin (media analysis); **2230** A Freespeech Radio News (repeat of Fri. newscast).

RADIO PRAGUE

2230 D News; **2235** S Letter from Prague, M-F Newsvision, A Insight Central Europe; **2240** S Mailbox, M One on One (interview), T Witness (oral history), W ABC of Czech (language), H Economic Report, F The Arts; **2250** S Readings from Czech Literature, T Talking Point (Czech issues), W Czechs in History or Spotlight (travelogue), F Away from Politics (poetry).

RVI, Belgium

2230 S Radio World, M-F News, A Music from Flanders; **2234** M-F Flanders Today (incl. press review); **2238** S Tourism in Flanders; **2243** M Focus on Europe, T Green Society (ecology), W/F Around the Arts, H Economics; **2244** S Brussels 1043 (letters); **2248** M Sports, W Around Town, H International Report, F Tourism in Flanders; **2254** S-F Soundbox (Flemish music).

WBCQ, Maine

7415 kHz.: **2200** S Radio Free Euphoria, M Jean Shepherd, F Pan Global Wireless, A HanZower; **2230** F Pab Sungenis Project.

WHRI, Indiana

5745 kHz.: **2200** S DXing with Cumbre.

WHRA, Maine

17650 kHz.: **2200** F DXing with Cumbre; **2230** A DXing with Cumbre.

2300 UTC / 6pm E / 3pm P - Page 54 Freqs

BBC WORLD SERVICE (am) - 5975, 12095

2300 D The World Today; **2330** F Global Business, A Pick of the World (BBC's best).

BBC WORLD SERVICE (eas) - 6195 via Singapore, 7105, 11685

2300 D The World Today; **2330** F Global Business, A Pick of the World (BBC's best).

CHINA RADIO INTERNATIONAL

2300 D News; **2310** S Report on Developing Countries, M-F Special Reports, A Global Review; **2320** S In the Spotlight (cultural magazine), A Listeners' Garden; **2330** M People in the Know (China's leading personalities), T Biz China, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

RADIO AUSTRALIA

2300 D News; **2305** F Lingua Franca (about language), A All in the Mind; **2310** S-H Asia Pacific (regional current affairs); **2330** S Earthbeat (ecology), M The Buzz (technology issues), T RA Arts, W Rural Reporter, H Media Report, F In Conversation (on science), A Innovations (new products).

RADIO CANADA INTERNATIONAL

2300 S/A The World This Weekend, M-F The World at 6; **2330** S Inside Track (sports anthologies) M-F As It Happens (interviews with newsmakers), A Madly Off in All Directions (comedy).

RADIO NETHERLANDS

2330 S/A News; M-F Newslines; **2335** S Sincerely Yours (letters), A Europe Un-

zipped; **2355** S The Week Ahead (program previews), A Insight (commentary).

RADIO NEW ZEALAND INTERNATIONAL

2300 S-H Middy Report (including Rural News **2333**, World Watch **2345**), F/A RNZ News; **2312** F Focus on Politics, A This Week in Parliament; **2333** F The Sampler (latest CDs), A Spectrum (life in NZ).

RADIO FOR PEACE INTERNATIONAL, Costa Rica

2300 S Neumaier Report, M Between the Lines, T A Woman's Voice, W Alternative Radio, H Making Contact, F Honoring Mother Earth: Indigenous Voices, A TUC Radio; **2315** S Living Enrichment Center; **2330** M TUC Radio, H Steppin' Out of Babylon, A Continent of Media.

RADIO PRAGUE

2330 D News; **2335** S Letter from Prague, M-F Newsvision, A Magazine; **2340** S Mailbox, M One on One (interview), T Witness (oral history), W ABC of Czech (language), H Economic Report, F The Arts, A Saturday Music (a mix); **2350** S Readings from Czech Literature, T Talking Point (Czech issues), W Czechs in History or Spotlight (travelogue), F Away from Politics (poetry).

RADIO ROMANIA INTERNATIONAL

2300 D Radio Newsreel; **2310** S Focus, M-F Commentary, A The Week; **2315** S Sunday Studio, M Pro Memoria (history), T Business Club, W Society Today, H Cards on the Table (debate) or The Romanian Next to You (interview), F Challenge for the Future or Terra 2001, A World of Culture; **2320** M Political Flash, T European Horizons, A RRI Encyclopedia; **2325** S Romanian by Radio, M/W/F Business Update, T Tourist News, H Listeners' Letterbox, A Roots (culture/traditions); **2330** S Romanian Itineraries, M Pulse of Transition, T Mother Nature (ecology), W Visit Romania, F Practical Guide, A Radio Pictures; **2335** S Listeners' Letterbox, M Performing Arts, T Youth Club, W Partners in a Changing World, F Cultural Survey, A Romanian Itineraries; **2340** M Pages of Romanian Literature, T/H Skylark (folk music), W Stage and Screen, F Spectator (voice of the people), A Bucharest Along the Centuries; **2345** M Romanian Hits, W Romanian Musicians, F Romanian Folk Music At Its Best, A DX Mailbag; **2350** S Romanian Folk Music At Its Best, M Sports Roundup, T Athlete of the Week, W Sports Club, H Football Flash, F Sports Weekend.

WBCQ, Maine

7415 kHz.: **2300** W World of Radio, F Pab Sungenis Project (cont'd), A Radio Timtron Worldwide; **2330** W Goddess Irina I Music Show, H Uncle Ed's Musical Memories, F WDCD.

WHRI, Indiana

9495 kHz.: **2330** A DXing with Cumbre.

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Bob Fraser, Cohasset, MA; Harold Frodge, Midland, MI; Glenn Hauser, Enid, OK; Michael Murray, UK; Bob Thomas, Bridgeport, CT; Adrian Sainsbury, RZ Intl; Harold Sellers, *BBC On Air*; *BCL News*; *BCDXC*; *Cumbre DX*; *DXA*; *DX Listening Digest*; *DX Ontario*; *Fineware*; *Hard Core DX*; *HFCC*; *ILG*; *NASWA*; *RFPI*; *World of Radio*; *Worldwide DX Club*.

Trading Spaces

It seems curious to me that after experiencing over four decades of weather satellites transmitting analog data (admittedly mixed with a digital data stream), we are now seeing a steady progression to solely digital data. Perhaps if the near universal availability of relatively low-cost equipment to receive the low resolution component of WXSAT transmissions had not happened, the process of leaving analog for digital might have occurred more quickly. As it is, many people in the amateur community believe that APT and WEFAX transmissions should remain available for the longer-term – at least that is my impression from reading the contributions to Internet mailing lists.

◆ GOES-9 Finds a New Home

In Europe, Meteosat-7 is currently the prime European geostationary WXSAT, but a “spare” – Meteosat-5 – was moved eastwards towards India to provide imaging for a temporary project. GOES-9, currently in storage (see figure 1), is to temporarily replace the GMS-5 WXSAT located over the West Pacific at 155° East on March 31, 2003. The National Oceanographic and Atmospheric Administration (NOAA) operates the geostationary constellation of GOES WXSATs, two of which (GOES-8 and GOES-10) are active. The remainder are available in case of failure.

GMS-5 is the Japanese Meteorological Agency's weather satellite, currently located at 140° East. Launched in 1995, it provides meteorological data for Japan, the West Pacific Ocean, Australia, and Asia. It is now scheduled to be temporarily replaced by NOAA's GOES-9 satellite on March 31, 2003, with its final location at 155° East.

In order to support the operation of GOES-9 from 155° East, a command and control ground station is currently being built in Fairbanks, Alaska. Current plans include the following activities:

GOES-9 leaves storage mode (105.7° West) on December 11, and undergoes a north-south maneuver on December 16. It begins the drift west at 0.8 degrees/day starting December 19, 2002. Some preliminary GOES-9 GVAR data will be available from approximately December 12, 2002, through January 11, 2003, using the Wallops, VA, station. Imaging will be suspended around January 11, 2003, to allow the transfer of control from Wallops to Fairbanks. Imagery from GOES-9 resumes approximately March 1, 2003, using Fairbanks Command and Data Acquisition station.

Operations using GOES-9 start March 31, 2003, at which time GOES-9 will be at 170° East. GMS-5 stops disseminating high resolution data, and GOES-9 transmits GOES-9

WEFAX via the GMS-5 satellite.

Users obtaining GMS-5 WEFAX from GMS-5 should not need to make any changes to receive GOES-9 WEFAX via GMS-5. GOES-9 WEFAX products should become available via GOES-10 as a one to one replacement of the current GMS-5 WEFAX products currently made available via GOES-10. Around April 18, GOES-9 arrives on station at 155° East.

◆ GOES-9 Imaging over Japan

The GOES-9 imaging schedule has not been finally defined, but it is likely to reflect the current GMS-5 scanning schedule. There will be hourly full-disc images from pole to pole between HH:34 and HH:00. Every six hours there should be an abbreviated full disc (location to be determined). For the other 20 hours, between HH:08 and HH:26, there are likely to be several shorter sectors in the northern hemisphere.

For more information on GMS-5, MTSAT (JMA's first digital meteorological satellite), and current GOES schedules visit:

<http://mscweb.kishou.go.jp/> and

<http://mscweb.kishou.go.jp/new/index.htm>

http://noaasis.noaa.gov/NOAASIS/ml/wefax_sked.html

GOES Status
Geostationary Operational Environmental Satellite (GOES) Status

	October 2002				
	GOES-8 (East)	GOES-9 (Storage)	GOES-10 (West)	GOES-11 (Storage)	GOES-12 (Storage)
Instrument Status					
Imager	G	Y ¹	G	G	G
Sounder	Y ²	G	G	G	G
Space Environmental Monitor	G	G	G	G	G
Subsystem Status					
Attitude and Orbit Control	Y ³	O ⁷	G	G	G
Thermal Control	G	G	G	G	G
Electrical Power	G	G	G	G	G
Telemetry and Command	G	G	G	G	G
Communications	Y ⁴	G	Y ⁶	G	G
Propulsion	G	G	G	G	G
Mechanisms	G	G	Y ⁵	G	G

Key
 Red = Not Operational
 Orange = Operational with degraded performance
 Yellow = Operational with limitations (or Standby)
 Green = Operational (or capable of)
 Δ = Status Change

Fig 1: Status of GOES satellites (NOAA)

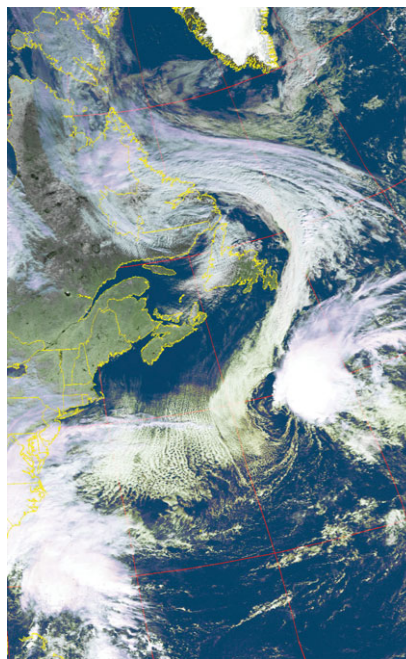


Fig 2: NOAA-17 October 15, 2002 from Hendricus Lulofs

◆ An Eye on the Northeast

Hendricus Lulofs is a Warning Coordination Meteorologist for the National Weather Service Forecast office in Caribou, Maine, and he kindly sent me figure 2 – an image received from NOAA-17. I have always been particularly interested in images of the northeastern part of continental USA because from my previous home in Plymouth, UK, I was able to receive images from Meteor 3-5 during its far westerly passes showing this region. My images included Newfoundland and part of the St Lawrence River, though at that point the satellite was virtually on the horizon and my imagination had to fill in the missing bits! I did once reach

Boston when interference levels were particularly low.

From a rather more convenient location in Caribou, Maine, Hendricus uses a Quorum WEFAX Explorer with QFAX software and a Quorum quadrifilar helix antenna. The Q-fax software automates image reception. For further improvement of the raw data he uses David Taylor's Wxtrack and Satsignal software to do the initial image processing. The image is further enhanced using Photoshop 6.0 and a Photoshop plug-in called Auto Eye by Auto FX software.

◆ Seasonal Greetings

Here at the holiday season, I'd like to extend seasonal greetings and sincere thanks to everyone who has e-mailed me or written during the last year. I look forward to the New Year and perhaps experiencing the new technology of digital weather satellites.

Frequencies (full set next month)

NOAA-12 and -15 transmit APT on 137.50 MHz
 NOAA-17 transmits APT on 137.62 MHz
 Meteor 3-5 may transmit APT on 137.30 MHz when in sunlight
 Meteor 2-21 may transmit APT on 137.85 MHz when Meteor 3-5 is off
 GOES-8 and GOES-10 use 1691 MHz for WEFAX

Abbreviations

APT - Automatic Picture Transmission (low res)
 WEFAX - Weather facsimile
 WXSAT - Weather Satellite



All Frequencies MHz

Panamsat Galaxy 5 - C-Band

125 degrees West longitude

1(H)	3720	Disney Channel - East (VC2+)
2(V)	3740	Occasional video
3(H)	3760	Trinity Broadcasting Network 5.58, 5.78 Trinity Broadcasting Network Radio Network 8.00 Trinity Broadcasting Network SAP Channel
4(V)	3780	Sci-Fi Channel - East (VC2+)
5(H)	3800	Cable News Network (CNN) (VC2+) 6.30 CNN Radio News 7.58 CNN Radio News
6(V)	3820	Superstation TBS - Atlanta (VC2+) 6.20 Superstation TBS SAP Channel
7(H)	3840	6.48 Brother Staire Radio - religious WGN Superstation - Chicago (VC2+) 5.58, 6.12 WCPE-FM, Raleigh/Durham/Chapel Hill, NC - Classical music 6.30, 6.48 WFMT-FM, Chicago, IL - Classical music 6.80 Yesterday USA radio HBO - West (VC2+) ESPN (VC2+) 5.80 Natural Sound audio Data Transmissions
8(V)	3860	ABC Family - East (VC2+)
9(H)	3880	Discovery Channel - West (VC2+)
10(V)	3900	CNBC (VC2+)
11(H)	3920	ESPN2 (VC2+)
12(V)	3940	HBO - East (VC2+)
13(H)	3960	Cinemax - West (VC2+)
14(V)	3980	TNT - East (VC2+)
15(H)	4000	6.20 TNT - East SAP Channel
16(V)	4020	7.56 La Cadena CNN Radio Noticias
17(H)	4040	The National Network (TNN) - East (VC2+)
18(V)	4060	USA Network - East (VC2+)
19(H)	4080	6.80 USA Network - East SAP Channel
20(V)	4100	Black Entertainment TV (BET) - East (VC2+)
21(H)	4120	Lifetime Television - East (VC2+)
22(V)	4140	6.80 Lifetime Television - East SAP Channel CNN Headline News (VC2+) 6.30 CNN Radio News 7.58 CNN Headline News Radio Network
23(H)	4160	A&E - East (VC2+)
24(V)	4180	Showtime - East (VC2+)

Panamsat Galaxy 9 - C-Band

127 degrees West longitude

1(V)	3720	(none)
2(H)	3740	Gospel Music Television (VC2+)
3(V)	3760	5.40 Truth Radio Network 1
4(H)	3780	5.80 Truth Radio Network 2
5(V)	3800	7.28 Genesis Communications Network
6(H)	3820	7.78 American Freedom Radio (KHNC-AM Johnstown, CO)
7(V)	3840	Occasional video
8(H)	3860	STARZ! - East (VC2+)
9(V)	3880	TBN Church Channel (digital)
10(H)	3900	(none)

11(V)	3920	(none)
12(H)	3940	STARZ! Theater - East (VC2+)
13(V)	3960	(none)
14(H)	3980	(none)
15(V)	4000	(none)
16(H)	4020	Encore - East (VC2+)
17(V)	4040	(none)
18(H)	4060	(none)
19(V)	4080	(none)
20(H)	4100	Encore Westerns - East (VC2+)
21(V)	4120	(none)
22(H)	4140	(none)
23(V)	4160	Occasional video
24(H)	4180	Data Transmissions

Loral Skynet Telstar 7 - C-band

129 degrees West longitude

1(H)	3720	TVE International Americas (digital) / Cox Sports Television (digital) / Worldlink Television (digital)
2(V)	3740	In Demand PPV (digital)
3(H)	3760	In Demand PPV (digital)
4(V)	3780	In Demand PPV (digital)
5(H)	3800	Playboy Television formats (digital)
6(V)	3820	(none)
7(H)	3840	(none)
8(V)	3860	(none)
9(H)	3880	VideoRola (digital)
10(V)	3900	Occasional video
11(H)	3920	(none)
12(V)	3940	Occasional video
13(H)	3960	Occasional video
14(V)	3980	A&E Networks (digital)
15(H)	4000	Playboy Television formats (digital)
16(V)	4020	The Vision Channel (digital)
17(H)	4040	HBO Networks (digital): HBO HDTV - East; HBO-HDTV - West
18(V)	4060	(none)
19(H)	4080	ViSat from Telemex (digital)
20(V)	4100	(none)
21(H)	4120	ACN TV - America's Collectibles Network
22(V)	4140	Olympusat (digital): B-Mania Channel, FamilyNet, TV Warehouse, TV Super Store
23(H)	4160	(none)
24(V)	4180	Data Transmissions

Loral Skynet Telstar 7 - Ku-band

129 degrees West longitude

1(V)	11720	Data Transmissions
2(H)	11740	Occasional video
3(V)	11760	Data Transmissions
4(H)	11780	Data Transmissions
5(V)	11800	Data Transmissions
6(H)	11820	Data Transmissions
7(V)	11840	Occasional video
8(H)	11860	Data Transmissions
9(V)	11880	Data Transmissions
10(H)	11900	Data Transmissions
11(V)	11920	Data Transmissions
12(H)	11940	Occasional video
13(V)	11960	Occasional video
14(H)	11980	Data Transmissions
15(V)	12000	Occasional video
16(H)	12020	Data Transmissions
17(V)	12040	Data Transmissions
18(H)	12060	Occasional video
19(V)	12080	Data Transmissions
20(H)	12100	Occasional video
21(V)	12120	Data Transmissions
22(H)	12140	Occasional video
23(V)	12160	Data Transmissions

24(H)	12180	Occasional video
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SES Americom Satcom C3 - C-Band

131 degrees West longitude

1(V)	3720	Fox Sports Digital Nets, ABC Family - West, National Geographic Channel (digital)
2(H)	3740	The Learning Channel - East (VC2+)
3(V)	3760	In Demand PPV (digital)
4(H)	3780	Lifetime Television - West (VC2+)
5(V)	3800	6.80 Lifetime Television - West SAP Channel
6(H)	3820	Hallmark Channel - East, Hallmark Channel - West (digital)
7(V)	3840	CourtTV - East, CourtTV - West, Northwest Cable News (digital)
8(H)	3860	C-SPAN 1 (U.S. House of Representatives)
9(V)	3880	5.20 C-SPAN Audio 1 - C-SPAN Radio
10(H)	3900	5.40 C-SPAN Audio 2 - BBC World Service Radio
11(V)	3920	Style Channel (digital)
12(H)	3940	Music Choice (digital)
13(V)	3960	America's Store
14(H)	3980	Fox Cable Networks (digital)
15(V)	4000	History Channel - East (VC2+)
16(H)	4020	The Weather Channel (VC2+)
17(V)	4040	7.78 The Weather Channel Background Music
18(H)	4060	New England Sports Network, Boston Catholic TV (digital)
19(V)	4080	Viacom Networks (digital): MTV 2, Nick Noggin / The N, MTV Jams, Nick Games and Sports (GaS), MTV Spanish, Nicktoons TV, VH-1 Classic Rock, Nick Too - West, VH-1 Soul, VH-1 Country, VH-1 Mega Hits, MTV Hits
20(H)	4100	Showtime Networks (digital): Showtime HDTV - East, Showtime Next - East, Showtime Family Zone - East, Showtime Women - East
21(V)	4120	The Movie Channel - East (VC2+)
22(H)	4140	TV Land (digital)
23(V)	4160	Showtime / The Movie Channel Networks (digital): Showtime - East, Showtime Too - East, Showtime Showcase - East, The Movie Channel - East, Flix - East, Sundance Channel - East, The Movie Channel Xtra - East, Showtime Beyond - East, Showtime Extreme - East
24(H)	4180	Jones Space Segment (digital): Product Information Network, Great American Country, Occasional video services
25(V)	4200	Comedy Central - East (VC2+)
26(H)	4220	Discovery Networks (digital): Discovery Health - East, Discovery Kids, The Science Channel, Discovery Home and Leisure, Discovery Civilization, BBC America - East, Discovery Wings, Health Network, Discovery Channel en Espanol
27(V)	4240	E! Entertainment TV - East (VC2+)
28(H)	4260	/ E! Entertainment TV - West (digital)
29(V)	4280	Oxygen Television (VC2+)

Panamsat Galaxy 1R - C-Band

133 degrees West longitude

1(H)	3720	Comedy Central - West (VC2+)
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2(V)	3740	Univision - East, Univision - West, Telefutara - East, Telefutara - West, Univision Cable - East, Univision Cable - West, Telefutara Cable - East, Telefutara Cable - West (digital)
3(H)	3760	Encore Networks (digital): Love Stories - East, Westerns - East, Mystery - East, Action - East, True Stories - East, Love Stories - West, Westerns - West, Mystery - West, Action - West, True Stories - West
4(V)	3780	Scripps Networks (digital): TV Food Network, Do-It-Yourself Network, Fine Living Network
5(H)	3800	Classic Arts Showcase
6(V)	3820	The National Network - West (VC2+)
7(H)	3840	Disney Channel - West (VC2+)
8(V)	3860	Cartoon Network (VC2+)
9(H)	3880	6.20 Cartoon Network SAP Channel
10(V)	3900	ESPN Alternates (digital)
11(H)	3920	MSNBC (VC2+)
12(V)	3940	Eternal Word Television Network (EWTN)
13(H)	3960	5.40 WEWN - Worldwide Catholic Radio 1 (English)
14(V)	3980	5.58 WEWN - Worldwide Catholic Radio (Spanish)
15(H)	4000	5.76 EWTN Spanish SAP Channel
16(V)	4020	7.38 WEWN - Worldwide Catholic Radio 2 (English)
17(H)	4040	ShopNBC
18(V)	4060	STARZ! (digital): STARZ! - East, STARZ! Theater - East, Black STARZ! - East, Encore - East, WAM - East, STARZ! - West, STARZ! Family - East, STARZ! Cinema - East, Encore - West, STARZ! Cinema - West
19(H)	4080	ESPN feeds (occasional) / ESPN Deportes (VC2+)
20(V)	4100	AOL Time Warner services (digital)
21(H)	4120	AOL Time Warner services (digital)
22(V)	4140	INSP - the Inspirational Network
23(H)	4160	5.58 Genesis Communications Network
24(V)	4180	7.92 WNMX-FM, Waxhaw, NC - variety
25(H)	4200	HBO and Cinemax Networks (digital): HBO Comedy - East, HBO Zone - East, WMax - East, @Max - East, HBO Comedy - West, HBO Zone - West, ThrillerMax - East, OuterMax - East, ThrillerMax - West, WMax - West, @Max - West, 5-Star Max - East, OuterMax - West, 5-Star Max - West
26(V)	4220	Cinemax - East (VC2+)
27(H)	4240	Home and Garden Network (VC2+)
28(V)	4260	USA Network - West (VC2+)
29(H)	4280	6.80 USA Network - West SAP Channel
30(V)	4300	AT&T HITS (Headend in the Sky) (digital): Goodlife TV Network
31(H)	4320	HBO and Cinemax Networks (digital): HBO - East, HBO 2 - East, HBO Signature - East, HBO Family - East, HBO Latino - East, HBO - West, HBO 2 - West, HBO Signature - West, HBO Family - West, HBO Latino - West, Cinemax - East, MoreMax - East, ActionMax - East, Cinemax - West, MoreMax - West, ActionMax - West
32(V)	4340	Data Transmissions



Monitoring the City of Brotherly Love

Nicknamed the "City of Brotherly Love," the fifth largest city in the United States is located in the Keystone State of Pennsylvania. Philadelphia, with a population of 1.6 million, metro area 5.78 million, contains more historic buildings than similar acreage in any other American city. Consequently, one of the major players in the federal bands in Philadelphia is the National Park Service.

Independence National Historical Park, located in downtown (called "Center City"), Philadelphia, is often referred to as the birthplace of our nation. At the park, visitors can see the Liberty Bell, an international symbol of freedom, and Independence Hall, a World Heritage Site where both the Declaration of Independence and the U.S. Constitution were created. In addition, the park interprets events and the lives of the diverse population during the years when Philadelphia was the capital of the United States from 1790 to 1800. A section of the park where Benjamin Franklin's home once stood is dedicated to teaching about Franklin's life and accomplishments. Spanning approximately 45 acres, the park has about 20 buildings open to the public.

Remember, these area profiles are not meant to be complete, but they are a good representative survey of what frequencies are available in each area and are based on the best information we have from open sources. I strongly urge our readers in the areas we profile to please send us updates. We cannot personally visit the areas we cover in this column, so I am relying on those of you who live in the areas we profile to update us on what you are hearing.

Also, we will not cover any Department of Defense (DoD) frequencies in these profiles. Complete nationwide coverage of those frequencies is now available for purchase on CD-ROM — *Grove Military Frequency Directory*. You can find out more information about that product on the Grove website at <http://www.grove-ent.com>

Here is the *Fed Files* profile for Philadelphia, Pennsylvania.

HIGH FREQUENCY

(Frequencies in kHz and mode USB unless otherwise indicated):

Coast Guard (NMK2) - 2103.0 2182.0 2667.0 2670.0 2675.0 2686.0 2702.0 3023.0 5320.0 5422.0 5680.0

Federal Bureau of Investigation (KGG64) - 2332.0 2810.0 5060.0 5390.0 6954.0 7905.0 9185.0 9240.0 11075.0 11491.0 12140.0 14460.0 14495.0 14533.0 15955.0 16174.0 16341.0 18171.0 18581.0 18666.0 19131.0 19346.0 23050.0 20604.0 23404.0 23805.0 24205.0 24775.0 26569.0 27785.0

Federal Communications Commission (KEG25) - 2110.0 4483.0 7602.0 7790.0 10655.0 13830.0 13990.0 18050.0 19230.0 22964.0 23035.0
Health and Human Services - 27575.0 27585.0

VHF/UHF

(Frequencies MHz, mode narrowband FM or as indicated)

Alcohol, Tobacco and Firearms - 165.2875/166.5375
Animal and Plant Health Inspection Service (KIY571) - 171.525
Bureau of the Mint (KEB961)
Maintenance - 408.175
Paging System - 407.700
Security - 408.000 415.875
Coast Guard (NMK2/3)
Law Enforcement Net - 162.325 162.350 162.6125 163.025 165.3125

Marine Frequencies - 156.600 156.675 156.700 156.800 157.000 157.050 157.075 157.100 157.150 157.175

Oil Spills - 39.760 39.920

UHF Military - 250.950 263.350 381.700 381.800 383.900

Customs Service (KAE363) - 165.4625/166.5875

Department of Energy (KFW606) - 165.900/164.325

Department of Labor - 406.200

Department of States (KHA208) - 409.625/407.200

Department of Veterans Affairs (KLM486)

Construction - 166.200 [may have been replaced by UHF assignment] 409.400

Paging System - 163.050

Security Net - 170.475 [may have been replaced by UHF assignment] 409.325/414.400

Drug Enforcement Administration - 418.825/415.600 418.900/416.325 418.675 418.750

Environmental Protection Agency - 164.450 165.4125 409.200/416.100

Federal Aviation Administration

Airway/NavAid Data Net - 409.850 413.600

Airway Maintenance Net - 166.175/164.050

Area/National Net - 172.875/169.275

Security - 416.875/408.825 410.900/408.825

Wind Shear Alert System - 162.300 410.300

Federal Bureau of Investigation - 41.990 162.6375 162.900 164.450 165.900/173.9375 166.750 166.825 167.5375/163.8625 167.5625 167.6125/162.975 168.375 168.425/163.700 168.975/162.875 170.900 170.950 173.100 173.125 173.150 173.9125/164.325 173.9625 173.9875 412.500

Statewide Simplex - 412.425 412.475 412.550 412.575 414.100 414.175 414.550 417.325 419.200 419.400

Federal Communications Commission (KEG25) - 167.050

Federal Emergency Management Agency (KPS300) - 173.7875

Federal Reserve System (KJS654)

Maintenance - 412.350/408.725

Page System - 171.2625

Security - 413.925/415.250

General Services Administration (KPA640) - 413.875 416.425 419.175

Health and Human Services (KEB962) - 122.850 155.235 155.340 171.2375

Immigration and Naturalization Service (KAD213) - 163.650/162.950 168.900 168.950

Internal Revenue Service (KAE308) - 163.125 164.100 165.950 166.000 166.4625 167.000 167.100 409.775 414.900 416.100 419.650

Marshall Service (KRD675) - 162.7125/170.800 162.7875 163.200

National Park Service (KGB798) - 164.725/164.125 171.650/164.575 417.775/411.775

National Weather Service (KIH28) - 162.475

Secret Service - 164.650 (Tango) 164.800/165.850 164.8875 (Oscar) 165.2125 (Mike) 165.375 (Charlie) 165.7875 (Baker) 166.400 (Golf)

United States Postal Service

AMF Supervisors (KRG617) - 162.225

Building Service Supervisors (KPS990) - 418.100 417.650

Bulk Mail Center Security (KQK923/934) - 418.300/416.775

Bulk Mail Center Supervisors (KQK927) - 170.600

Bulk Mail Center Vehicle Operations Supervisors (KGM589) - 164.500

General Post Office Supervisors (KPS790) - 409.275/411.550

Mail Processing (KPS965) - 412.275/410.200

Mail Processing Supervisors (KPS786) - 171.000/169.175

Main Plant Supervisors (KPS964) - 414.725/410.325

Postal Inspectors Service (KRO633) - 169.850/169.000 170.175 (simplex)

Postal Inspectors Service (KHA245) - 169.650/407.775 170.125/407.775 414.750/407.775

Postal Inspectors Service (KHA244) - 415.050/407.725

Postal Inspectors Service (KPS848) - 416.075/409.225

Vehicle Operations Supervisors (KRR427) - 164.200

Vehicle Operations Supervisors (KBP345) - 166.275

Vehicle Operations Supervisors (KQK926) - 169.600

VMF Supervisors (KQK928) - 166.975/164.700

White House Communications Agency - 162.6875 171.2875 (Xray-Zulu duplex)

As part of our metro profiles I also include frequencies allocated to FAA Air Traffic Control for major airports in the area. In the Philadelphia area there is only one:

Philadelphia International Airport (KPHL) Philadelphia, Pennsylvania, USA

ATIS 133.400
Clearance Delivery 118.850 348.600
Ground Control 121.900 348.600 121.650
Control Tower 118.500 (Runways 09L/27R 17/35 08/26) 135.100 (Runway 09R/27L) 327.050
Unicom 122.950
Emergency 121.950 243.000
Philadelphia Approach Control 123.800 001-089 degrees at or below 5,000 feet

126.600 317.550 090-269 degrees above 5,000 feet
 126.850 270-360 degrees at or below 5,000 feet
 127.350 090-269 degrees at or below 5,000 feet
 128.400 273.575 270-089 degrees above 5,000 feet
 263.125 090-360 degrees and 270-360 degrees
 291.700 001-089 degrees

Final Approach Frequency 125.400

Instrument Landing System Runway 26 123.600

Instrument Landing System Runway 27L 120.425

Philadelphia Departure Control

119.750 269.250 090-269 degrees

124.350 320.100 270-089 degrees

Class B Airspace Traffic Service

118.350 Southwest 6000 feet and below

119.750 Southeast runway 09 active 10000 feet and below

119.750 Southeast runway 27 active 8,500-10,000 feet

123.800 Northeast runway 27 active 5,000 feet and below

124.350 Northeast runway 09 active 10,000 and below

124.350 Northwest 8,000-10,000 feet

124.350 West runway 09 active 8,500-10,000 feet

124.350 West runway 27 active 10,000 feet and below

126.600 Southeast runway 27 active 5,500-8,000 feet

126.600 Southwest 6,500-10,000 feet

126.850 Northwest 7,500 feet and below

127.350 South 5,000 feet and below

127.350 Southeast runway 27 active 5,000 feet and below

128.400 North/Northeast 6,500-7,500 feet

128.400 Northeast runway 27 active 5,500 feet and above

128.400 West runway 09 active 8,000 feet and below

263.125 Northwest 7,500 feet and below

263.125 South 5,000 feet and below

263.125 Southeast runway 27 active 5,000 feet and below

269.250 Southeast runway 09 active 10,000 and below

269.250 Southeast runway 27 active 8,500-10,000 feet

273.575 North/Northeast 6,500-7,500 feet

273.575 Northeast runway 27 active 5,500 feet and above

273.575 West runway 09 active 8,000 feet and above

291.700 Northeast runway 27 active 5,000 feet and below

317.550 Southeast runway 27 active 5,500-8,000 feet

317.550 Southwest 6,500-10,000 feet

319.150 Northeast runway 09 active 10,000 and below

320.100 Northwest 8,000-10,000 feet

320.100 West runway 09 active 8,500-10,000 feet

320.100 West runway 27 active 10,000 feet and below

323.100 Southwest 6,000 feet and below

◆ EPA and Homeland Security

According to a recent article in *Mobile Radio Technology* magazine the Environmental Protection Agency (EPA) is now tasked with protecting the national water supply and responding to any chemical, radiological or biological incident. There is mention of the EPA establishing an environmental rapid response team to be based in Las Vegas, Nevada. Federal monitors nationwide might want to plug in the common EPA frequencies and keep an ear out for any activity.

HIGH FREQUENCY

(Frequencies kHz, mode USB or as indicated)

It has been reported that the EPA uses some of the HF network frequencies operated by the Federal Emergency Management Agency (FEMA). The following have been reported in the past:

2360.0 2377.0 2445.0 2658.0 3341.0 3388.0 4780.0 4990.0
 5211.0 5961.0 6049.0 6108.0 6151.0 6176.0 6821.0 7348.0
 10493.0 11721.0 11801.0 11957.0 12216.0 17649.0
 20027.0

VHF/UHF

(Frequencies MHz, mode narrowband FM or as indicated)

Aircraft 122.900 122.925

Marine 156.300 156.375 156.425 156.500 156.600 156.650
 156.700 156.800 156.900 157.000 157.075 157.100
 157.125

High band VHF 163.100 164.650 165.4125 169.575 170.375
 170.400 172.550 172.700 173.9125

Note: We have received reports in the past of EPA law enforcement officials and support staff showing up on other government/military agency communications systems.

◆ Mystery Solved in Texas

Recently radio hobbyists in Houston, Texas, were puzzled over some mysterious communications they were receiving in the government VHF high band during enhanced tropospheric conditions. One of the hobbyists finally found the source of the mysterious transmissions: the Department of Energy's Strategic Petroleum Reserve (SPR).

The Strategic Petroleum Reserve is the nation's first line of defense against an interruption in petroleum supplies. It is an emergency supply of crude oil stored in huge underground salt caverns along the coastline of the Gulf of Mexico. The primary locations are at Bryan Mound and Big Hill, Texas, and West Hackberry and Bayou Choctaw, Louisiana.

Decisions to withdraw crude oil from the SPR during an energy emergency are made by the President under the authorities of the Energy Policy and Conservation Act. In the event of an energy emergency, SPR oil would be distributed by competitive sale. Although used for emergency purposes only once to date (during Operation Desert Storm in 1991), the SPR's formidable size (almost 600 million barrels) and the U.S. government's stated policy to withdraw oil early in a potential supply emergency make the SPR a significant deterrent to oil import cutoffs and a key tool of foreign policy.

Strategic Petroleum Reserve caverns range in size from 6 to 30 million barrels in capacity; however, the typical cavern is 10 million barrels and cylindrical in shape having a diameter of 200 feet and a height of 2,000 feet. A typical cavern is large enough for Chicago's Sears Tower to fit inside with 170 feet to spare. The Reserve has created over 50 of these huge underground caverns.

Here is a small profile of the known communications systems associated with the SPR. Many thanks to Chris Parris and especially Myles B. for their observations on the SPR.

HIGH FREQUENCY

(Frequencies kHz, mode USB or as indicated)

VHF/UHF

(Frequencies MHz, mode narrowband FM or as indicated)

Aircraft 122.750

Marine 156.300 156.375 156.425 156.475 156.600 156.650
 156.700 156.800

VHF High band systems

Construction 164.375

Law Enforcement/Security 164.225/168.450

Maintenance 167.875/164.250 171.200/164.750

Operations and Maintenance 171.950/167.975

Operations and Maintenance (simplex) 164.325 167.825
 167.925

KFW674 Weeks Island, Louisiana
 KFW696 Bayou Choctaw, Louisiana
 KFW697 New Orleans, Louisiana
 KHA819 St. James, Louisiana
 KHA820 Weeks Island, Louisiana
 KMA72 St. James, Louisiana
 KMA73 Bayou Choctaw, Louisiana
 KMA75 West Hackberry, Louisiana
 KMA77 Bryan Mound, Texas
 KMB20 New Orleans, Louisiana
 KMB21 St. James, Louisiana
 KMB22 Bayou Choctaw, Louisiana
 KMB23 Weeks Island, Louisiana
 KMB24 West Hackberry, Louisiana
 KMB29 Bryan Mound, Texas
 WGA82 St. James, Louisiana
 WGA83 Bayou Choctaw, Louisiana
 WGA85 West Hackberry, Louisiana
 WGA87 Bryan Mound, Texas

And that does it for this edition of the *Fed Files*. See you all in *two* months, since this column will now be published bi-monthly. Until then 73 and good hunting.

Longwave Resources

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✓ **The BeaconFinder** A 65-page guide listing Frequency, ID and Location for hundreds of LF beacons and utility stations. Covers 0-530 kHz.
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Military Trunks and Radio Manuals

The United States military relies on trunked radio to provide efficient, reliable communication for the day-to-day administrative tasks of running bases and camps. Monitoring these systems can be a challenge, since frequencies for military trunked radios are often more difficult to determine than for public safety agencies. The Federal Communications Commission (FCC) databases that are so useful for commercial and local government systems do not contain Federal government frequency assignments, so a good deal more investigation is necessary.

Howdy Dan,

I'm a regular subscriber to *Monitoring Times* and your "Tracking the Trunks" column is fantastic. I used to monitor Fort Bragg, North Carolina's trunked federal system (406-420mhz) in the conventional mode before they went digital. Can you advise if the new Uniden Bc785D or BC250D with digital card installed will enable me to monitor federal trunked systems operating in the digital mode?

Thanks, Broadus

My records show that Fort Bragg, North Carolina, shares a Motorola Type II system with Pope Air Force Base. It's believed to have 28 channels, and unless transmissions are encrypted you should be able to use a BC250D or BC785D (with a BCi25 card) to listen to the audio and track trunked conversations. Please write again and let us know what you find!

Many military systems operate in the 400 MHz range, with a standard base of 406.000 MHz and an offset of 25 kHz. Here are some other military installations, along with talkgroup information (in decimal) where available:

Aberdeen Proving Ground (APG), Maryland

APG, among other things, performs environmental and safety testing on a variety of tactical wheeled and tracked vehicles. Live fire from Abrams tanks and Bradley fighting vehicles is common. APG operates a Motorola Type II system that carries both analog and digital voice traffic. Frequencies for Aberdeen and the adjacent Edgewood Area are:

406.225, 406.350, 406.700, 407.250, 407.275, 407.475, 408.550, 409.025, 409.500 and 410.150 MHz.
688 Range Clearances
1904 APG Police

Air Force Academy, near Colorado Springs, Colorado

The Academy operates a Motorola digital system on several 400 MHz frequencies including:

407.150, 407.350, 407.950, 409.025, 409.225, 409.500, 409.750 and 409.775 MHz.

Andrews Air Force Base, Suitland, Maryland

Andrews is home base for Air Force One, the President's official aircraft. Andrews has also been the center of activity for combat air patrols flown over Washington, D.C. after the terrorist attacks of September 2001. Frequencies in use:

406.350, 406.950, 407.150, 407.425, 408.025, 408.200, 408.750, 409.350 and 409.725 MHz.

176 Presidential Pilots Office
208 Command Post Operations
432 Emergency
1136 1st Helicopter Squadron Operations
1776 Field Operations (1)
1808 Field Operations (2)

Edwards Air Force Base, California

Edwards has served as a flight test range for decades and is also the West Coast landing area for the space shuttle. Apparently there are two Motorola systems here, one with frequencies of:

408.200, 409.225, 409.550, 409.775, 409.825, 410.150, 410.525 and 410.750 MHz, and the other using 406.350, 406.750, 408.175, 409.125, 409.500, 409.650, 409.750 and 410.400 MHz.

Fort Huachuca, Sierra Vista, Arizona

The Army performs a good deal of classified communications-related work here in southern Arizona. The Motorola Type II system on base uses:

406.950, 407.150, 407.550, 407.950, 408.150, 408.350, 408.750 and 409.150 MHz.

Luke Air Force Base, Glendale, Arizona

Luke AFB is a major training center for fighter pilots and is home to more than 200 military aircraft. The Motorola trunked system has been heard on:

407.150, 407.950, 408.150, 408.200, 408.750, 409.150, 409.375, 409.550, 409.775 and 409.950 MHz.

Camp Lejeune, North Carolina

This Marine Corps base covers a large geo-

graphic area and provides training and mission preparation. Frequencies used on the Motorola system are:

406.350, 406.950, 407.150, 408.550, 408.750, 409.550, 409.750 MHz. Use a base frequency of 406.350 MHz and an offset of 50 kHz.

80 Military Police Dispatch
624 Camp Johnson Operations
656 Marine Combat Training
1744 Fire Dispatch
9008 New River Air Station Base Operations

Fort Meade, Maryland

This Army base is probably most famous for being home to the National Security Agency (NSA). The Motorola Type II system uses:

406.325, 407.400, 407.575 and 409.450 MHz.

48 Fire Dispatch
80 Fire Operations (1)
112 Fire Operations (2)
368 Military Police Dispatch
400 Tactical
464 Gate Security
880 Command and Control



Patuxent River Naval Air Warfare Center, Patuxent River, Maryland

Informally known as "Test Pilot School," Pax River trains Navy test pilots and performs a variety of aircraft flight testing. Possible frequencies include:

406.350, 410.150, 411.325, 412.050, 412.750, 416.950, 417.925 and 419.675 MHz.

Camp Pendleton, California

This West Coast Marine Corps training facility uses a Motorola Type II system on:

406.550, 406.950, 407.175, 407.300, 407.325, 408.200, 408.750, 409.275, 409.750, 409.950 and 410.150 MHz.
592 Naval Hospital Security
1424 Range Control (Range 2)
5584 Range Control (Range 1)

Peterson Air Force Base, near Cheyenne Mountain, Colorado

The 21st Space Wing provides missile warning through NORAD, the North American Aerospace Defense, and space control through the U.S. Space Command. The Global Positioning System (GPS) is also controlled from here. Frequencies on the Motorola Type II are:

406.350, 406.550, 407.150, 407.350, 407.950, 408.750, 408.950, 409.550, 409.750, 409.950 MHz.
16 Peterson Ground
272 Fire/Rescue TAC



368 Peterson Crash
496 Base Operations
528 U.S. Air Force Museum
1072 Flight Line Operations

Vandenberg Air Force Base, California

Vandenberg serves as launch facility for many military and commercial satellites. The Motorola Type II frequencies are: 407.150, 407.550, 408.750, 408.950 409.150, 409.350, 409.550, 409.750, 409.950 and 410.150 MHz.

Wright-Patterson Air Force Base, near Dayton, Ohio

The extensive aircraft museum at "Wright-Pat" is familiar to many Dayton HamVention attendees, but there's more going on there than tourism. The frequencies on the Motorola Type II system are:

406.350, 406.550, 407.150, 407.350, 407.950, 408.750, 408.950, 409.550, 409.750 and 409.950 MHz. Use a base frequency of 406.350 MHz and an offset of 50 kHz.

368 Crash Crews
8016 Security (1)
8048 Security (2)
8080 Security (3)
11312 Flight Operations

Finding Scanner Manuals

I tried to bring up http://www.support.radioshack.com/support_electronics/2849.htm to get a manual for my Pro39 scanner, but it wouldn't come up. Is this the right one or do you know another? Thanks for your articles...I enjoy reading them, Bob

Manuals for many scanners, old and new, are available on the Internet. Most of these electronic manuals are in Portable Document Format (PDF) and require the use of free reader software from Adobe Systems, Inc., called Acrobat Reader. If you do not have this program installed already, go to <http://www.adobe.com> and download it.

Retrieving manuals is helpful not only for current owners, but for anyone contemplating

purchasing a new or used scanner. Reading the manual before spending money is a more cost-effective way of finding out whether the unit you're looking at has the features, performance, coverage and ease-of-use that you're looking for.

Manuals and other support information for scanners sold by Radio Shack are available for downloading at http://www.radioshack.com/ProdSupport/DocumentDetail/DocumentDetailIndex.asp?P=support_electronics&D=2849&T=htm or, go to <http://www.radioshack.com>, click on the "Product Manuals" button, then select "Communications" from the list of subjects. Select "Scanners" from the next screen and you'll be presented with a list of just over 100 scanner models, everything from the PRO-20 and PRO-22 up to the PRO-92 and PRO-95.

Uniden has a slick web site at <http://www.uniden.com>, and their scanner product support page is located at <http://www.uniden.com/productsupport.cfm?cat=Scanners>. The manuals for the new BC250D and BC785D digital scanners are already available there.

AOR has a website with a number of manuals for discontinued scanners dating back to the AR880 and AR900. There's even a manual for their ADU5000 external spectrum display unit. The manuals can be found at <http://www.aorusa.com/support.html>

Icom maintains a technical document section on their web site at <http://www.icomamerica.com/support/documents/index.html> where you can find manuals for their current production receivers (down near the bottom of the page).

If you don't have any luck finding an electronic manual to download, you'll probably have to go back to the old-fashioned paper kind. Sometimes calling or writing to the manufacturer can yield a free or inexpensive copy mailed to you. There are also a number of individuals who sell original and photocopied manuals for scanners, as well as for test equipment, ham radio gear and other electronics. The Hobby Radio Stop in Ohio has many, many manuals for older radios. You can find them on the web at <http://www.bearcat1.com/owner.htm>. Manual Man (Peter Markavage), <http://www.manualman.com>, and Gary Gompf, W7FG at <http://www.w7fg.com/>, each have hundreds of manuals for a wide variety of electronic equipment, including scanners.

So Bob, the support page for the PRO-39 can be found directly by going to http://www.radioshack.com/ProdSupport/DocumentDetail/DocumentDetailIndex.asp?P=support_electronics&D=2849&T=htm. Hope this helps!

Cincinnati Airport

I've just read your "Tracking The Trunks" column in the September 2002 edition of Monitoring Times. Thanks very much for the information on Hamilton County, Ohio, and Cincinnati.

However, somehow, the headline of "Boone and Kenton Counties, Kentucky" was omitted before the paragraphs about the radio systems in use at Cincinnati-Northern Kentucky International Airport. That omission gives readers unfamiliar with the greater Cincinnati area the impression that the airport is located in Hamilton County, Ohio, when it is

not. Also, the inference can be made that in the case of a major event at the airport that Cincinnati and Hamilton County authorities would be the ones first called on to assist when, more likely, agencies in Kenton and Boone Counties would be first.

A bit of information (or confusion, depending on one's viewpoint), is in order. Cincinnati-Northern Kentucky International Airport is located in Boone County, Kentucky, near the town of Hebron. Though the airport is located in Boone County, Kentucky, it is owned by Kenton County, Kentucky.

I believe that it might be a good idea to mention the headline omission and clarify the information to the Monitoring Times readership. I'm sure it would be appreciated. Bradley

Thanks for clearing that up, Bradley. Often the airports serving major metropolitan areas are not located within the center city limits, but how many are actually located in an adjoining state?

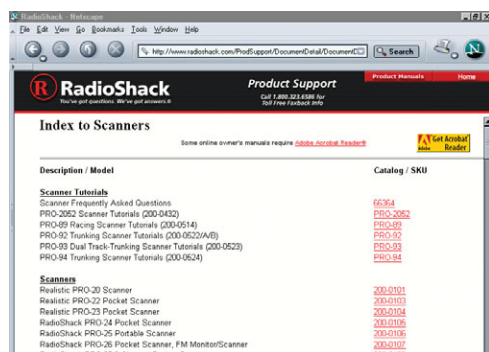
OpenSky in Pennsylvania

I read your column with great interest and was wondering if you could give an update on how the OpenSky installation is coming along in Pennsylvania. Also, with the new Uniden scanners coming out soon, will I be able to monitor OpenSky radios? Thanks, Gregory

In 1996 the state of Pennsylvania began a process to investigate replacement alternatives for their aging patchwork of radios. They eventually settled on an all-digital system from M/A COM (now owned by Tyco Electronics) called OpenSky, which is based on Internet transmission standards. Participation by counties and local municipalities is not mandatory, and many jurisdictions have chosen not to join. The latest rumors indicate testing is underway in the state capitol, Harrisburg, but that some problems have emerged (not surprising for a brand new system) and that things are moving more slowly than expected.

OpenSky transmissions are not compatible with Project 25 equipment or standards. OpenSky uses a different vocoder (AMBE, or advanced multiband excitation) and uses time division multiple access (TDMA) to fit two simultaneous conversations into a single radio channel. The new Uniden scanners will not be able to understand the format or content of the OpenSky digital signal. At this point hobbyists who want to monitor OpenSky have very few choices, all of which boil down to using a M/A COM OpenSky radio pre-programmed with the Pennsylvania radio system parameters. There was talk early on about some type of purchase program for journalists and possibly hobbyists, but given the slow and difficult testing schedule such a program may be postponed.

That's all for this month. Keep those e-mails coming to dan@signalharbor.com or danveeneman@monitoringtimes.com, and check my website at <http://www.signalharbor.com> for more digital scanner information, including frequencies. Until next month, happy monitoring!



The GHFS Net is History

Well, not literally, but it is true this HF net has changed its name again. Probably the most listened to Department of Defense (DoD) net in the HF spectrum for many years has been the old Global HF System (GHFS) radio net. As of October 1 of 2002, this net has undergone another name change. Old time radio monitors will remember when this net was originally called the GCCS (Global Command and Control System).

On June 1, 1992, the former Global HF System (GHFS) was created by consolidating other U.S. Air Force (USAF) and U.S. Navy (USN) HF networks, including the USAF Global Command and Control System (GCCS), the Navy's Ship-to-Shore High Command (HICOM) network, and the dedicated Strategic Air Command (SAC) Giant Talk System. The goal of the merger was to develop one worldwide non-dedicated HF network capable of providing Command and Control (C2) HF communications support to all authorized DoD aircraft and ground stations.

Last year when the new semi-annual *Department of Defense Flight Information Handbook* was released on October 31, we noted that the name had been changed again – HF-GCS (High Frequency-Global Communications System).

In addition to the name change, DoD is apparently closing down another of the main U.S. Air Force stations in this net, Thule AFB in Greenland, and replacing it with another U.S. Navy communications facility in Iceland at Keflavik.

In another interesting development, sometime around October 1 of last year, listeners were surprised to hear operators moving phone patch traffic off of HF-GCS primary frequencies to selected discrete frequencies for extended operations. We have been told that this was done to reduce congestion on the HF-GCS primary frequencies.

Here is the latest information we have on the HF-GCS network.

❖ USAF High Frequency Global Communications System (HF-GCS)

The HF-GCS System is a worldwide network of 15 high-powered HF stations providing air/ground HF command and control radio communications between ground agencies and US military aircraft and ships. Allied military and other aircraft are also given support in accordance with agreements and international protocols. The HF-GCS is not dedicated to any service or command, but supports all DoD authorized users on a traffic precedence/priority basis. General services provided by the HF-GCS include:

General Phone Patch and Message Relay Services
Automatic Link Establishment (ALE)
HF Data Support
Command and Control Mission Following
Emergency Assistance
Broadcasts
HF Direction Finding Assistance
ATC Support

The old high power HF equipment being utilized within the HF-GCS has now been replaced with "Scope Command" equipment. Scope Command incorporates Automatic Link Establishment (ALE) technology for use over HF. (Scope Command is not the name for this network as some have indicated on various internet newsgroups. It is the name of the equipment upgrade being done to the network.) By January 2003, all HF-GCS station transmit and receive equipment will be remotely controlled from the Centralized Net Control Station (CNCS) at Andrews AFB, Maryland.

This ALE technology automates many of the functions performed by the operator, such as selecting the best propagating frequency from a list of authorized frequencies.

HF-GCS Procedures

General Calling. Aircrews use a preliminary call as outlined in publication *ACP-121 U.S. Supplement 2*, using the collective callsign "Mainsail" or the HF-GCS station callsign (i.e. "Sigonella Global this is Dark 86 on 11175, over"). HF-GCS operators require approximately 10 seconds (for automated equipment configuration) to respond to calls for service. The HF-GCS operator may request the aircraft change to a discrete frequency for improved and/or extended service.

Published Frequency Listing. HF-GCS stations operate on "core" frequencies to provide increased "Global" coverage. The published frequency listing does not reflect complete system frequency authorizations. These published frequencies are used for initial contact, EAM (Emergency Action Message) broadcasts, and short-term command and control phone patch and message delivery. Other extended or special services are moved to each station's available "discrete" frequencies.

Frequency Guide. The frequency guide below will give the monitor the best frequencies to monitor communications on a regular basis (mode is upper sideband - USB).

Primary HF-GCS	24 hours	8992 11175 kHz
Back up HF-GCS	Day	13200 15016 kHz
Back up HF-GCS	Night	4724 6739 kHz

❖ Commonly Heard Callsigns

BRICKWALL - Osan Air Mobility Control Center (AMCC)
DENALI - Elmendorf Air Mobility Control Center (AMCC)
HILDA EAST - Tanker Airlift Control Center (TACC) East Cell (Scott AFB)
HILDA WEST - Tanker Airlift Control Center (TACC) West Cell (Scott AFB)
MAINSAIL - Authorized users may contact and request service from Global HF System stations by using the general net air-ground call sign "MAINSAIL". Any Global station hearing the call "MAINSAIL" will respond and provide the requested service.
S4JG - A universal Navy call sign assigned to Patrol Squadrons (VP) for use in radio checks. Instead of using the briefed, tactical call sign, the Navigation/Communications operator on the P-3C Orion aircraft would use S4JG on voice and also teletype to get a communications check with a Tactical Support Center (TSC), HF-GCS station or Anti-Submarine Warfare (ASW) Operations Center (ASWOC). In theory by using S4JG, the tactical call sign is less likely to be compromised.
SKYBIRD - The collective call sign for all U.S. Strategic Command (USSTRATCOM) command posts, launch control centers, Global HF stations, Air Traffic Control (ATC) towers on Air Combat Command (ACC)/Air Mobility Command (AMC) host tenant bases, Single Sideband (SSB) HF radio stations, and air defense sites in Canada.
SKYKING - The collective call sign for all Single Integrated Operational Plan (SIOP) committed aircraft and missile crews. Its meaning is "all SIOP committed aircraft and missile crews copy the following message."
SKYMASTER - The collective callsign to all USSTRATCOM airborne command post.
TRACKER - US Air Force Europe Tanker Recce Airlift Control Center (UTRACC)

The current station list for the HF-GCS net follows (all times are in UTC, frequencies in kHz, and mode is USB):

Andersen Air Base (AB), Guam (Voice call Guam Global)
Summer: 4724 (1300-2000) 6739 (1100-2000) 13200 (2000-1300) 15016 (2000-1100)
Winter: 4724 (1200-2030) 6739 (1000-2030) 13200 (2030-1200) 15016 (2030-1000)
Year round/24 hours: 8992 11175
ALE Address/Frequencies: GUA3137 4721 5708 6721 9025 11226 13215 15043 18003 23337

Andrews AFB, Maryland (Voice call Andrews Global) HC-GCS CNCS
Winter: 4724 (0200-1230) 6712 (2400-1230) 13200 (1230-0200) 15016 (1230-2400)
Summer: 4724 (0430-0930) 6712 (0230-0930) 13200 (0930-0230) 15016 (0930-0230)
Year round/24 hours: 8992 11175
Discrete Frequencies: 8058 11053 11159 11181 11220 11460 18015

ALE Address/Frequencies: ADW 3137 4721 5708 6721 9025 11226 13215 15043 18003 23337

Ascension Island (Voice call Ascension Global)
Year round: 4724 (2400-0700) 6739 (1900-2400) 8992 (24 Hrs) 11175 (24 Hrs) 15016 (0700-1900)
Discrete Frequencies: 11159 11226 14497
ALE Address/Frequencies: HAW 3137 4721 6721 9025 11226 13215 15043 18003 23337

Croughton AB, United Kingdom (Voice call Croughton Global)
Winter: 4724 (1800-0800) 6712 (1800-0800) 13200 (0800-1800) 15016 (0800-1800)
Summer: 4724 (2230-0400) 6712 (2230-0400) 13200 (0400-2230) 15016 (0400-2230)
Year round/24 hours: 8992 11175
Discrete Frequencies: 4894 5708 5117 6728 6731 6993 7567 7933 8032 10648 11118 11129 11181 11226 11232 11271 13822 15091
ALE Address/Frequencies: CRO 3137 4721 6721 9025 11226 13215 15043 18003 23337

Diego Garcia Naval Station, Indian Ocean (Voice call Diego Garcia Global)
Year round/24 hours: 8992 11175
Discrete Frequencies: 9012 11181 11226 11244 11269 13254 15095 20910
ALE Address/Frequencies: JDG 3137 4721 5708 6721 9025 11226 13215 15043 18003 23337

Elmendorf AFB, Alaska (Voice call Elmendorf Global)
Winter: 4724 (0230-1900) 6739 (0030-2130) 13200 (1900-0230) 15016 (2130-0030)
Summer: 4724 (1000-1300) 6739 (0800-1400) 13200 (1300-1000) 15016 (1400-0800)
Year round/24 hours: 8992 11175
ALE Address/Frequencies: AED 3137 4721 5708 6721 9025 11226 13215 15043 18003 23337

Hickam AFB, Hawaii (Voice call Hickam Global)
Summer: 4724 (1000-1600) 6739 (0500-1000) 13200 (2000-1300) 15016 (2000-1100)
Winter: 4724 (0800-1700) 6739 (0400-0800) 15016 (1700-0400)
Year round/24 hours: 8992 11175
Discrete Frequencies: 11181 13242
ALE Address/Frequencies: HIK 3137 4721 6721 9025 11226 13215 15043 18003 23337

Keflavik NAS, Iceland
Note: This HF-GCS station will become operational in January 2003. It is slated to replace Thule AB in Greenland. ALE address will be IKF.

Lajes AB, Azores (Voice call Lajes Global)
Summer: 4724 (2230-0400) 15016 (0400-2230)
Winter: 4724 (1800-0800) 15016 (0800-1800)
Year round/24 hours: 8992 11175 13200
Discrete Frequencies: 11220 13440 14896
ALE Address/Frequencies: PLA 3137 4721 5708 6721 9025 11226 13215 15043 18003 23337

McClellan, California (Voice call McClellan Global)
Summer: 4724 (0730-1300) 6739 (0530-1300) 13200 (1300-0730) 15016 (1300-0530)
Winter: 4724 (0500-1530) 6739 (0300-1530) 13200 (1530-0500) 15016 (1530-0300)
Year round/24 hours: 8992 11175
ALE Address/Frequencies: MCC 3137 4721 5708 6721 9025 11226 13215 15043 18003 23337

Offutt AFB, Nebraska (Voice call Offutt Global)
Summer: 4724 (0600-1100) 6739 (0400-1100) 13200 (1100-0600) 15016 (1100-0400)
Winter: 4724 (0300-1400) 6739 (0100-1400) 13200 (1400-0300) 15016 (1400-0100)
Year round/24 hours: 8992 11175
Discrete Frequency: 11181
ALE Address/Frequencies: OFF 3137 4721 5708 6721 9025 11226 13215 15043 18003 23337

Salinas, Puerto Rico (Voice call Puerto Rico Global)
Summer: 4724 (0300-1000) 6739 (0100-1000) 13200 (1000-0300) 15016 (1000-0100)
Winter: 4724 (0200-1100) 6739 (2400-1100) 13200 (1100-0200) 15016 (1100-2400)
Year round/24 hours: 8992 11175
Discrete Frequencies: 9006 10648 11056 11220 11484 15087
ALE Address/Frequencies: JNR 3137 4721 5708 6721 9025 11226 13215 15043 18003 23337

Sigonella Naval Station, Sicily, Italy (Voice call Sigonella Global)
Summer: 4724 (2230-0400) 15016 (0400-2230)
Winter: 4724 (1800-0800) 15016 (0800-1800)
Year round/24 hours: 6739 8992 11175 13200
ALE Address/Frequencies: ICZ (Operational early 2003)

Thule AB, Greenland (Voice call Thule Global)
Year round/24 hours: 8992 11175 13200 15016
ALE Address/Frequencies: No capability

Yokota AB, Japan (Voice call Yokota Global)
Summer: 4724 (1200-1930) 6739 (1000-2130) 13200 (1930-1200) 15016 (2130-1000)
Winter: 4724 (0930-2200) 6739 (0730-2400) 13200 (2200-0930) 15016 (2400-0730)
Year round/24 hours: 8992 11175
ALE Address/Frequencies: 3137 4721 6721 9025 11226 13215 15043 18003

Notes:

1. Summer schedules run from April-September. Winter schedules run from October-March.
2. Thule Global (Greenland) will decommissioned in January 2003 and it will be replaced with NAS Keflavik in Iceland.
3. The Incirlik AB, Turkey station was decommissioned May 1, 2001.
4. The Air Force Eastern Test Range (AFETR) HF Network may be used as a backup to the HF-CS network. The net can be contacted on USB 10780 (primary) and 20390 kHz (secondary). Their call sign is "CAPE RADIO." Another backup to the HF-GCS will be profiled in a future *Milcom* column.
5. There is one HF-GCS ALE station that is somewhat a mystery – South Atlantic, address MPA. The frequencies for this station are listed as 3137 4721 5708 6721 9025 11226 13215 15043 18003 23337 kHz. Nothing more officially is known about this station, but some monitors have theorized that it could be the Royal Air Force (RAF) station in the Falkland Islands, or a station in either Surinam or Panama.

◆ Unclassified Phone Patch and Message Relay Services

Phone Patch Service. Phone patching allows direct voice communications between ground agencies and aircraft by electronically connecting telephone circuits to radio transmitters and receivers. Phone patch service is reserved for official unclassified business only and are supposed to be limited to five minutes or less. Patches of more than 5 minutes or of a sensitive nature will probably be run on a discrete frequency. When aircrews request a phone patch they must include all the information necessary for HF-GCS operators to complete the call, such as the identity or location of the called parties and telephone number, if known.

Message Relay Service. HF-GCS operators transcribe encoded or plain-text messages

for aircraft or ground stations and forward them to the addresses by radio or landline. The text of the messages can be in the form of alphanumeric, code words, plain text, acronyms, and/or numerical sequences. Aircrews may use "READ BACK" procedures when the message data is critical, or when an incomplete transmission is suspected due to poor radio reception.

◆ Automatic Link Establishment

ALE allows automated ground agency contact by selecting the best station and best frequency without operator interaction. ALE radios make this possible by using a datafill that contains frequency, station and other pertinent information. For ALE radios to operate properly, the radio must have a loaded datafill, be turned on in the "automatic" mode and remain there the duration of the flight. If the radio is removed from the ALE mode, history tables will require time to rebuild and initial communications may be slightly degraded.

◆ Command and Control Mission Following

Command and control (C2) agencies can use the HF-GCS for mission tracking/control of their aircraft. Aircraft responsible to a C2 agency for mission tracking/control should transmit an initial contact/departure report to a HF-GCS station after takeoff. The following information should be included:

Aircraft Call Sign
Departure point and time
Destination point and ETA
Relay Instructions for C2 Agencies
Remarks: Distinguished Visitor (DV) codes, special instructions, etc.

◆ Emergency Action Message (EAM) Broadcasts

Most HF-GCS stations transmit high priority EAMs on published frequencies during specific broadcast periods. During EAM broadcast periods, aircraft may only transmit in-flight emergency traffic.

◆ Emergency Assistance

Distress and urgency situations should be clearly identified by the words "MAYDAY" or "PAN" as appropriate. Aircrews should transmit present position and heading when encountering grave or serious emergency situations.

And that does it for this month. Until next time, 73 and good hunting,

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Pipsqueak in the Twin Cities

As <http://www.diymedia.net> notes, the new Low-Power FM (LPFM) service is not really all that new. In 1948, the FCC created a Class D FM license. These stations operated with 10 watts or less transmitter output. Due to their low power, many regulations applicable to Class A/B/C stations did not apply to Class D outlets. By the late 1970s, however, it was felt these stations were limiting the expansion of public radio. In 1978 the FCC decided to stop issuing new Class D permits, and to strongly encourage existing stations to switch to a higher class by increasing power. Today, only 110 Class D stations remain. 20 years ago, DXers already believed we'd seen the last *new* Class D station.

We were wrong.

I'm going to take a bit of a historical detour here. Back in the 1920s, there was a rush to build the first broadcasting stations. Most of the early stations were started by commercial interests. However, the major educational institutions of the Midwest were also among the early broadcasters. WILL (U. of Illinois), WBAA (Purdue U.), WOI (Iowa State), and KUSD (U. of South Dakota) were among the stations built. The University of Minnesota was also involved in early broadcasting. Their KUOM would end up sharing its 770 kHz dial position with Carleton College's WCAL in Northfield.

By the 1980s, the Northfield station had surrendered its AM license for cancellation. (WCAL lives on as a 100,000-watt classical-music FM station.) KUOM got full possession of the daytime hours on 770. Neither station was ever permitted to operate at *night* though; they were too close to WABC in New York. KUOM carried a variety of agricultural information and public-radio spoken-word material.

In 1991, Minnesota Public Radio acquired commercial FM station WLOL-99.5. The call letters were changed to KSJN, and the station used to carry the classical music programs formerly carried on their 91.1 station. 91.1 switched to mostly spoken-word programming. And there was no longer a need for KUOM-AM.

So the university turned it over to the students. It became "Radio K", with an excellent (in my humble opinion!) modern rock format. And a serious problem. KUOM is still only permitted to broadcast during the day. Days are short in Minneapolis in the winter! In De-

cember, KUOM is permitted to operate only between 7:45am and 4:30pm.

A number of methods were explored in the hopes of obtaining nighttime hours for the station. I'm not privy to the precise reasons night operation on 770 kHz was deemed impossible. Looking at a map of the station's transmitter site, I would imagine the cost of land to erect additional towers for a directional antenna was way too high. FM would be an obvious answer, but new FM channels are not available in most large cities. Minneapolis is no exception.



KUOM-FM and KDXL will be sharing 106.5 MHz

KUOM found another solution. Remember, until the 1980s KUOM-AM was sharing its channel with WCAL-AM. Maybe an FM station would be willing to share its channel with a KUOM-FM? Yes, there was such a station. In 1978, one of the last Class D stations authorized was KDXL, at St. Louis Park High School. As with many high-school stations, KDXL operates only while school is in session. (This is one of the reasons the Class D station was phased out originally; many were off the air more than they were on, yet were tying up a channel that could be used by a more-active larger station.)

And so, a permit was issued for a new Class D station, KUOM-FM. The station will share time with KDXL on 106.5MHz. (I've not been able to determine exactly which hours each station will use.) Over the years, many time-sharing combinations have used separate transmitter sites. For example, the recently-defunct KKSU-580 used a transmitter roughly 30 miles from that of time-sharing partner WIBW. In this case, KUOM-FM will be using the

KDXL transmitter, located several miles west of campus.

Bits and Pieces

Last month I wrote about the FCC authorizing IBOC digital radio. WOR-710 in New York is already testing digital, and area listeners aren't happy. Irwin Shapiro wrote "You can hear the digital noise +/- 12kHz from its center frequency... It obliterates the ability to DX both 700 and 720 on the AM dial during the nighttime hours."

Also on the IBOC front, Ibiquity Digital has built an experimental station for IBOC-AM tests. WD2XXM are the call letters, and the station is located in Frederick, Maryland. It operates on 650 kHz with 4kW, daytime only. The station will test the hybrid mode, so it will be intelligible on standard analog radios. Some DXers have already heard WD2XXM, simulcasting WTOP-1500.

There are two major changes on the AM dial to note this month, both in Northern California. KTNS-1090 Oakhurst (near Fresno) received permission to move to 1060 in October. This move is already complete. More dramatically, KTRB-860 Modesto has received permission to move to San Francisco. The transmitter will actually be near Gilroy, south of San Jose. Service to Modesto will be replaced by a new station on 840 kHz.

Are you hearing anything interesting on the dials? Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Good DX!

HAUSER'S HIGHLIGHTS

ROMANIA: Radio Romania International

B-02 English schedule:

0200-0256 9550 11740 11830 11940 15270 15370
0400-0456 9550 11830 15335 17735
0600-0656 9530 11830
0637-0654 756 9510 9570 9625 11790 11940
0700-0756 17720 21480
1400-1456 15365 17790
1700-1756 7155 9625 9690 11940
2100-2156 5955 7105 7215 9690
2300-2356 7195 9510 9570 11940
(Observer, Bulgaria, Wolfgang Büschel, Mike Barradough)

Holidays a Prime Time for Pirate DXing

For many decades the best period for DXing North American pirate radio stations has been the days around the major holidays of Christmas and New Years. The number of pirate transmissions always increases on these holidays, and during the days and weekends surrounding the holidays. Many stations produce special holiday programming, and they take to the shortwave bands to send these shows out to listeners. Some stations, with holiday names like **Happy Hanukkah**, feature shows related mainly to the holidays. But, other year-round pirates commonly produce holiday specials for either Christmas or New Years, or both.

So, if Santa has provided a new receiver under the tree, there is no better time of year to check out the pirate bands around 6955 kHz for unlicensed free form pirate radio programming.

❖ Switzerland Broadcasting Situation

Once again this year your editor spent a couple of weeks in Switzerland during the late fall. Most *MT* readers are already aware of the severe cutbacks in broadcasting at **Swiss Radio International**. The Swiss government has decided to de-emphasize shortwave broadcasting, especially to North America, while replacing it with a "SwissInfo" internet web site at <http://www.swissinfo.org>.

The Swiss folk music audio channel on Swiss International Airlines is now announced to be a production of SwissInfo, not Swiss Radio International, which handled this function in the past. Although the SRI transmitter at Sottens remains active, the former Swiss transmitters at Schwarzenberg and Lenk have been closed and largely dismantled for a number of years.

As we see here this month, the underground

bunker that formerly contained the Lenk transmitter for Swiss Radio International has been replaced by a wholesale milk barn. Only the concrete foundations of the transmitter bunker remain today. Even these foundations have found an alternative use as a foundation support for the barn where farmers in the Lenk area can deliver their product for subsequent processing into milk, butter, cheese, and other Swiss dairy products.

One little-noted result of all this is that a contender for the main Swiss international broadcaster is DJ Stevie at the Europirate **Radio 510 International**. The wisdom of these policy moves by the Swiss government are certainly open to vigorous debate, but when a pirate radio station contends for the status of leading shortwave broadcaster in a country, it is unusual by any standard. Like SRI, DJ Stevie maintains a web site at <http://www.radio510.org/> to supplement (not replace) his pirate radio programming.

Radio 510 does not actually broadcast from Switzerland, but instead their shows are relayed over **IRRS** in Milan, Italy (see feature article in this issue), using 10 kilowatts on 13840 kHz. Their current schedule is Saturday and Sunday at 0730-0830 UTC using 13840 kHz on both days. This is not an impossible DX catch by any means from most parts of North America, so you may want to check out the pirate radio voice of Switzerland next weekend. DJ Stevie is an excellent verifier via the Basel address listed below.

❖ Free ACE Available

Harry Helms, publisher of *The ACE* bulletin of the Association of Clandestine radio Enthusiasts, announces that a sample copy of *The ACE* is currently available free of charge in .pdf format over the internet. If you would like to take advantage of this unusual offer, send an e-mail to Harry at ak6c@earthlink.net and let him know that *Monitoring Times* sent you.

WHAT WE ARE HEARING

Our readers heard all of these North American pirate broadcasters this month. Most stations still transmit in the vicinity of 6955 kHz, although frequencies can vary up and down a little bit, often to avoid the **Peruvian La Voz de Campesino** after sunset, which can frequently be heard in North America on 6956.5 kHz. Pirate broadcasting increases

noticeably on weekends, and around major holidays, as we discuss here this month.

Betty Boop Radio- Rollo Vandigh changed the identification to Betty Boo Radio in some recent nostalgia transmissions. (Providence)

Captain Morgan- The programming on this one is still mainly rock music. (None, asks for reports on the Free Radio Network and The ACE)

K-2000- Here's another old pirate who has joined the ranks of current relays by unidentified pirates. (None current)

KIPM- Alan Maxwell's complex and weird psychological dramas remain some of the most unusual material on shortwave today. (Elkhorn)

Radio Clandestine- Relays of old R. F. Burns programs from the most classic pirate of all time have been popping up lately. This one is a real treat. (None currently valid)

Radio Free Euphoria- Captain Ganja jumped the season, and played Christmas songs around Thanksgiving. (Belfast)

Radio Pigmeat International- This relatively new one features rock and reggae music. (None known)

Radio Time Machine- Another nostalgia station, this one relays old radio tapes, often with a pirate radio connection. One of their recent relays was an old Radio Gong show. (Elkhorn)

Sensation AM- This Dutch Europirate has been verifying e-mailed reception reports for their broadcasts on 15705 kHz. (Uses sensationam@hotmail.com e-mail)

Voice of Captain Ron SW- Captain Ron remains active with rock music and pirate chat. (Uses captainronswr@yahoo.com e-mail)

Voice of the Abnormal- As the station name indicates, their shows may not be the usual cup of tea for some people, but they have been sending out QSLs. David Martin heard them from Australia. (Elkhorn)

Voice of the Tiki- Hawaiian music has a home on pirate radio, thanks to this one. (Elkhorn)

WAIR- Using a slogan of "All Indie Radio," this one joins the stable of pirates who parody the international broadcaster All India Radio. (Elkhorn, also requests log reports to bulletins)

WHYP- The James Brownyard memorial station, allegedly from North East, PA, remains one of the most active and creative pirates on the air today. (Providence)

WMOE- This one normally revolves around promotion of The Three Stooges, accounting for their call letters. (Uses wmoe6955@yahoo.com e-mail)

WMPR- This self-described "dance party" station remains quite active, with their "Micropower Radio slogan. (Still none; occasionally verifies loggings in pirate DX bulletins)

WPUP- The pirate "puppy" station devoted a recent show to the subject of paranoia. (Belfast)



Milk Barn now on Former SRI Transmitter Bunker

continued on page 83

Mid-Winter Targets

Welcome to a new year of basement band DXing! Storm static has disappeared in most parts of the country and the clear, cold nights seem to carry signals just a bit farther and stronger than at any other time. To take advantage of winter's prime conditions, our column this month offers some proven tips for DXing and also lists lucrative targets that you can try for.

Low-Band Strategy

One of the first things you must learn when hunting for longwave DX is patience. Often, you must "park" on a particular frequency for some time before a station of interest can be heard. This happens for two primary reasons. First, distant signals often fade in and out over a period of several minutes on longwave. You can never be quite sure when the next "peak" will occur, and you don't want to miss it when it comes.

Second, you will often encounter "dueling" IDs – two or more stations (sometimes many more) transmitting at once on or near a common frequency. Our ear-brain systems are remarkably effective at separating this cacophony, based on slightly different signal strengths and/or pitches. Sometimes, however, you'll hear stations that are virtually identical in pitch and strength, and this is where the going can get rough.

In such cases, you may be able to get an ID by listening through several cycles of identifications. Sooner or later you're likely to notice a point where the ID of one station occurs during the "quiet" period of another. This gives you a brief moment to snag an ID, provided some other form of interference doesn't creep in. (It took me nearly 15 minutes of monitoring to get a positive ID on beacon PEL/410 kHz [Brazil] during a recent DXpedition.)

A final suggestion is to use your set's channel memories if it is so equipped. You can enter a dozen or more target frequencies, and then step through them in a rapid succession, looking for activity on a regular basis. Of course, you should still do some fine tuning at each frequency just to be sure you're not missing anything off to the side. This memory trick is widely used by those hunting for longwave broadcast signals from Europe.

Hardware Hints

The need for a good antenna cannot be over-emphasized. A directional antenna, such as a box loop or ferrite antenna can be a huge help when you are DXing for elusive signals. Not only do they help you peak on a desired signal, but equally

important, they can be aimed to "null" an offending station. Overall signal strength may not be quite as strong on a loop as compared with a "longwire" but a far more important factor – signal to noise ratio – will usually be better. Low noise reception is a hallmark of loop antennas.

A tape recorder is an excellent tool to have available during your DXing sessions. With a recorder, you can study an ID "off-the-air" and repeat it as many times as you like. Sometimes all it takes is "another set of ears," and a tape recorder allows you to play the sounds for someone else to listen to. You could even create an audio file from the tape and share it over the Internet. Finally, a tape recording is a good way to preserve an especially rare intercept, providing you with an audio "keepsake" of your achievement.

A good pair of headphones are almost essential for any serious DXing on longwave. They allow you to concentrate on the signals at hand, and block out any household noises or undesired acoustical effects of a room. They will also help you maintain harmony in the family!

Best Bets

Table 1 lists some DX beacons that have been logged in recent years. The list is by no means exhaustive, and to a large degree, "DX" is defined by where you are listening from. Use the list as a starting point and feel free to share what you are hearing with *Below 500 kHz*. I'm always happy to receive loggings, and will try to fit them into a future column.



Well-made tube receivers like this National RBL-5 still hold their own on today's band.



A Ferrite Loop Antenna such as the Quantum QX Pro Loop from Radio Plus+ can help you sort out competing signals on the same frequency (<http://www.dx-tools.com>.)

Mailbag

Barry Williams (AL) wrote to share the details of his DXing setup. He's using a venerable RBL-5 by National, which tunes from 15 to 600 kHz. The set was originally used by the Navy in World War II and has become quite rare on today's market. Barry was fortunate to find his in mint condition on eBay. He pairs it up with a Quantum QX Pro Loop and a JPS NIR-12 audio filter for a high performance receiving station. His two best catches so far are: QT/332 kHz (Thunder Bay, ON) – 1112 miles, and TKL/385 kHz (Tikal, Guatemala) – 1109 miles. Keep up the good work, Barry. We look forward to hearing more from you.

I wish everyone the best of peace and happiness in 2003. Why not drop me a line (e-mail or postal) and tell me what you'd like to see in this column for the new year. It has always been your column, and I value all comments that I receive on its content. 73, and best LW DX.

Table 1. Selected DX Beacons

FREQ.	ID	LOCATION
212	UCF	Cienfuegos, Cuba
232	GT	Grand Turk Isle, BWI
232	UMZ	Manzanillo, Cuba
248	MBJ	Montego Bay, Jamaica
260	TOY	Tongoy, Chile
265	JH	Julianehab, Greenland
266	UNV	Nuevas, Cuba
266	UBY	Bayamo, Cuba
270	FLO	Flores, Azores
270	NN	Nanortalik, Greenland
274	SAL	Sal, Cape Verde
279	SI	Simiutaq, Greenland
294	ZIP	Zipaquira, COL
300	SM	San Marcos, BRAZ
311	TBG	Panama City, PAN
326	BHF	Freeport, BAH
330	CZM	Cozumel, MEX
360	KIN	Kingston, Jamaica
369	ZDX	St. Johns, Antigua
375	BUN	Buenaventura, COL
376	ZIN	Great Inagua, BAH
380	UCY	Cayojoabo, CUB
382	POS	Port of Spain, Trinidad
385	TKL	Tikal, Guatemala
387	PV	Providenciales, Turks & Caicos
391	DDP	Dorad, Puerto Rico
400	PIE	Bucaramanga, COL
405	BVI	Boa Vista, BRAZ
407	SWA	Swan Island, HOND
410	PEL	Pelada, Brazil
415	CBC	Cayman Brac, BWI
415	SLS	Salinas, ECU
450	PPA	Puerta Plata, Dominican Rep.
526	ZLS	Stella Maris, BAH

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R5 (pending FCC type acceptance)	SCN 2	\$ Call

ALINCO

DJ-X3T	SCN 11	\$209.95
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DJ-X2000T	SCN10	\$499.95

AOR

AR8200IIIB	SCN51	\$589.95
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YAESU

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H800 Skymatch Active	ANT 15	\$129.95*
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DXCC How Hard Can It Be?

Okay. Let me begin by getting the annual New Year's resolutions out of the way. You'll find they do not change much from year to year but that does not reduce their meaning or importance. Stand up...Put your hand over your heart and repeat after Old Uncle Skip:

- 1) If I do not have an Amateur Radio license I will get licensed this year.
- 2) If I do have a license I will upgrade it to the next highest license until I am an Extra class.
- 3) If I am an Extra class I will find somebody who isn't licensed and help them get licensed. (You thought you were going to get out of this because you achieved 1&2, didn't you?)
- 4) I will repeat number 3 until I can't get on the HF CW bands without turning on my 250 Hz filter.

Now let me throw in one more just for fun and as a challenge:

- 5) I will earn my DXCC certificate this year.

Becoming a member of the DX Century Club is one of the great accomplishments of the amateur radio hobby. Proving to all the world that your personal ham station can reach out and touch 100 entities (not countries...more on this later) serves to impress even nonradio oriented personages. Further, performing this task fills a nice little album of QSL cards from around the globe. With the DXCC certificate on your wall you can proudly say to all who will listen that you have "Worked the World."

The first time I put in for the DXCC award took me about 15 years. Let me assure everyone that it was a very unusual case. Dur-

ing that duration I finished an undergraduate degree, completed a Masters degree, got married, had two kids, changed professions three times, served my country in Operation Desert Storm, moved five times, picked up a certification in Public Management and continued in two part time gigs, one of which has been writing for *MT* and a number of other magazines. Oh, and did I mention that radio is not my only hobby? As John Lennon put it: "Life is what happens while you're making other plans."

I am now going around the DXCC route again, just for fun, using 5 watts QRP. I am chasing DX very casually because I really enjoy ragchewing more than DXing. I have 90 entities worked and 60 entities confirmed in less than two years with all cards coming by way of the QSL Bureau, which really slows things down. I know many serious contesters who routinely work the equivalent of DXCC and more on any given contest weekend!

The point of all this and the New Year's challenge is that making the contacts that go toward earning your DXCC is no more difficult than tossing enough RF up into the air at the right times and places – even if the amount of RF is as little as 5 watts or even 1 watt or less (it has been done). The bigger challenge (as anyone who has achieved this award can attest to), is getting in those precious confirming QSL cards through all those different postal systems.

So let's take a look at this whole DXCC process. I think you will quickly see that getting that certificate up on your wall is well within the reach of any ham with HF privileges. (See New Years Resolution #2 listed above).

◆ When is a country an entity?

Right from the get go, let me clear up a common misconception about the DXCC award. Becoming a member of the DX Century Club is not about contacting and confirming 100 individual nations. The award is given for contacting and confirming 100 different *entities*. The main criteria for establishing an entity under the rules of the award are, among other things:

Political Entities: These are defined as United Nations (UN) member states, nations with assigned International Telecommunication Union (ITU) callsign blocks, or any other entities having separate membership in the International Amateur Radio Union.

Geographic Separation: When an above-defined Political Entity is physically separated into two or more parts, either by 100 kilometers or more of land or 350 kilometers of water.

(There are few more standards to these criteria but this gives you the gist of things).

Special Areas: Covers everything not accounted for by the above two categories. One of these is the International Telecommunications Headquarters in Geneva, Switzerland (4U1ITU). This is considered to be a special entity.

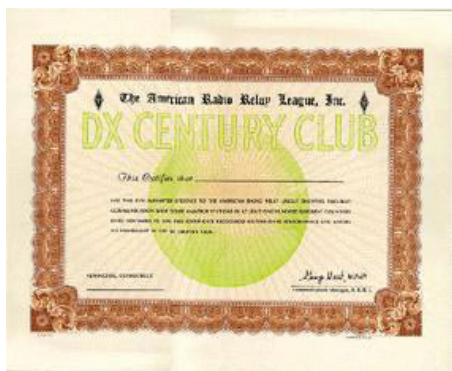
There are also ineligible areas, such as Demilitarized Zones and criteria for removal brought about by the changes in the "real" world. Recent examples of ineligibility brought about by political changes have been the German Democratic Republic (DM), Czechoslovakia (OK) and the Canal Zone (KZ5).

Now if you paid attention in Miss Grundy's sixth grade geography class, you're already getting a sense of how one country can count for more than one entity. Take, for example, our own good old US of A. The contiguous 48 states count as one entity; Alaska and Hawaii, under the above rules, count as two more entities. So if you have, in your ham career, already received the Worked All States (WAS) award, you are already down to 97 entities on your DXCC countdown. Grab 4U1UN in New York City (one of those special entities) and you can count another notch in your belt without leaving home, so to speak.

Right now there are a total of 335 recognized entities with nearly 300 demonstrating regular amateur radio activity at least part of the year, so grabbing 100 can't be all that hard, right? It's actually even easier than you might imagine.

Let's go back and take another look at that ham who has achieved WAS. No matter how modest this person's station might be, he or she clearly has a transmitter and antenna that can put a signal out over a fairly large chunk of the Northern and Western hemispheres. A quick glance at a list of those recognized entities reveals that 48 of them are within the North American continent. So you do not have to go too far from home to get nearly half way through to DXCC. If you are on the East coast, you can easily find most of the rest of what you need without looking any further than the European continent; West coast folks enjoy a similar list of possibilities into Asia and Oceania. We haven't even brought up South America or Africa. Remember that DXCC involves contact less than one third of all the possibilities.

The DXCC Honor Roll lists the callsigns of literally hundreds of hams who have worked at least 325 of the current 335 entities. There



are even quite a number who have "worked 'em all." The journey of a thousand miles begins with the first step.

◆ Pay attention to propagation!

We are still relatively near the top of the Solar Cycle (Yes... I AM an optimist). Without going too deeply into the depths of the science and Voo Doo of propagation, every place in the world is open to every other place in the world on some portion of the ham bands at some time of the day or night. Remember, many people have achieved DXCC on all five traditional ham bands and unofficially on the WARC bands. Learning where and when to listen will put you in a good position to get those hard ones on the other side of the world.

Let me give you one example. A common practice for those of us on the East Coast is to take good advantage of the occasional bout of insomnia. Waking up well before dawn puts the East Coast ham in good position to grab a mess of Pacific and Asian contacts. Putting a bit of thought into propagation paths will fill your log in no time at all.

◆ Contest Contest Contest

Let's clear up another little bit of possible misinformation. You do not need to enter a contest and submit a log (even though it can be a lot of fun) to participate in a contest. The big annual CQ and ARRL sponsored DX contests are places where it is literally possible to work 100 entities in one weekend. In addition to all of the common entities (which number in the hundreds), many more unusual entities will be activated specifically for the duration of a contest weekend. If you are not concentrating on running up a contest score and you are only looking to get those missing entities into your log book, a simple "hunt and pounce" scan up and down the active bands will get you where you want to go. You can augment your searching with a DX spotting network either on the Internet or one set up on your local packet radio system.

◆ See Spot run

DX spotting networks can be found on the Internet at places such as <http://www.dxspots.com>. If you have an active local packet radio cluster, it is fairly likely that the area DX oriented club has a spotting net set up as well. The good thing about spotting networks is that they show you where the DX is. The bad thing about spotting networks is that they show everyone on the planet where the DX is. Once a "rare one" shows up on a spotting net the pileup soon follows. There remains a lot to be said for tuning around and just happening to be in the right place at the right time when someone you need is calling CQ and you get them in the log before the sharks start to circle.

Still, the spotting networks are good for going for your DXCC because you are not necessarily looking for rare DX, just different DX from what is already in your log. Lots of common DX entities show up on the spotting nets and are easy catches.

◆ DX Nets

There are a number of DX nets on the air, mostly on 20 meters in the evening. A good listing of current nets can be found at: <http://www.ac6v.com/nets.htm>. Most nets are open to the general public but many give precedence to active members. One very popular net that is a good example of how such operations work is the 247 DX Net that meets daily from 2100 – 2300 UTC on 14.247. The net control station will give the call sign of one of the DX stations that have checked into the net and then ask for the calls of folks who want to work the station. You throw out your call and then wait your turn.

Some folks frown on this method of working DX but for all major awards the contact is as valid as if you dug the station out of a screaming pileup. My advice remains as always... This is a hobby. It's supposed to be fun. If working stations by way of a DX net is fun, go for it!

◆ DXpeditions

Several times a year, various groups of hearty ham folks expend time, money and in some cases even their personal well being to make rare DX entities available to the rest of us. In the quest to "work 'em all" these operations generate a great deal of interest in the ham radio community. Keeping one eye on DX news on the Internet or in one or more of the various DX newsletters will let you know in plenty of time to plan your attempts to work these operations. While the pileups can be big and noisy, most well run DXpeditions manage their contacts in such a way that almost anyone with a bit of patience can get a confirmed contact.

For a complete look at the rules and procedures for becoming a member of the DX Century Club, web on over to <http://www.arrrl.org/awards/dxcc/> or write to ARRL Headquarters, DXCC Desk, 225 Main St., Newington, CT 06111.

Have fun. I'll see you on the bottom end of 40 meters.

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Jan 18 1200UTC - Jan 19 2359 UTC

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Continuing the Zenith Restoration

Last month, we completed our initial assessment and cleaning of the Zenith 6-S-229, our current restoration project. Those of you who are just starting to read this series of articles might like to review the November and December issues to learn the details. However, in a nutshell, this radio was introduced as one that looked so far gone that a housewife doing a basement cleanout might immediately relegate it to the trash can. Even an antique radio hobbyist might keep it around only to use as a parts set.

As a matter of fact, I've come to the realization that our radio might very well have once been someone's parts set. For one thing, the dial scale (which was cracked and a bit buckled) was hanging loose and wrong side out; the main dial pointer had been put on backwards; and the "split second," or vernier pointer was missing altogether. Now I see that those carelessly-installed dial parts could well have been removed from the set for which my radio was a donor. Not quite wanting to throw them out, the restorer might have just slapped the replaced parts onto the donor set just to keep track of them.

The two missing tube shields and dial glass could also have been transferred to another set. Further fueling my suspicions is the fact that the

Zenith's model number was neatly penciled in a couple of locations on the chassis – giving the radio an "inventoried" look. Be that as it may, there is still a lot left to work with and we should certainly be able to bring this restoration to a successful conclusion.

The November column was devoted to a careful examination of the radio, during which all of the obvious trouble spots were pinpointed. In December, the coil shield cans and tuning capacitor assembly were removed to facilitate the cleaning of the top surface of the chassis – which was covered in coarse gummy dirt – and the further disassembly of the dial mechanism. After cleaning, the cans were replaced, but the tuning capacitor was left off for later maintenance.

◆ Scrounging for Parts

After turning in the December column, I began to think about sources for the missing parts. At the beginning of this project, I warned you that work might be delayed while I looked for the parts, or a junker parts set, at radio swap meets. However, as the restoration gained momentum I began to get impatient – particularly since winter radio meets are few and far between.

While browsing the internet for parts, I came across the web site of Great Northern Antiques (<http://www.gn4radios.com>), specialists in Zenith parts (both reproduction and salvaged) and literature. Querying them for my missing items, I found that they did have the correct "split second" hand, but not the other things I needed. At \$14.95 plus shipping and handling it seemed expensive at first – until I began looking at generic clock hands at clock repair parts sites. Second hands of the size and style I thought I might need were in the same price class and hub dimensions were generally not given and I had no idea if they would fit.

So I went ahead and ordered from Great Northern. In due time, the part arrived and I was surprised to find that it was red! Not having looked at a lot of Zeniths with this feature, I wasn't expecting that. If I had purchased a generic hand I probably would have sprayed it gold to match the one on my Zenith "shutter dial" radio, which has a similar face.

Great Northern's hand fit perfectly on the dial drive and I could see that, due to the unusual hub arrangement, it would have been difficult to install a generic clock hand. The red color should look very nice against the black scale and I was very well pleased with my purchase. Particularly since I could now correctly assemble the dial mechanism – which would make it possible for

me to align the set as soon as I could bring it back to life.

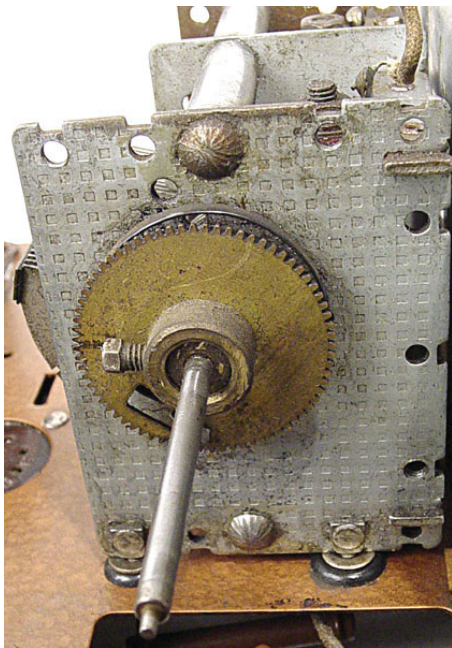
The missing tube shields are also critical parts, without which it would be impossible to make the set operate properly, much less attempt to align it. Here my junkbox came to the rescue. I have a much smaller Zenith chassis of similar vintage. It's in nice shape and some day I hope to find a cabinet for it. In the meantime I'm using it as a tube shield donor. It will be easy to replace those missing shields once I locate some at a swap meet. The Zenith shields of this era are rather specialized: painted to match the chassis color and fitted with a little dimple at the base that bayonet-locks into the chassis mount, securing a positive ground connection. I was pleased to find that the "donated" shields fit perfectly.

In response to my advertising for junker sets or parts in various internet news groups, a fellow restorer advised me that I might find a dial glass at the S. Larose (clock supplies) web site at <http://www.slarose.com/store2/store.ihmtl>. Sure enough, "round convex dial glass" was listed there in sizes from 2" to 12.75" in very small increments of diameter. Alan at Great Northern advises me that clock glasses usually don't fit properly in Zeniths, but prices are quite reasonable (\$5.00 range) and I'll probably order one in the spirit of experimentation.

◆ Capacitor Replacement

Whereas the major part of last month's work session took place above the chassis, this month I turned the chassis upside down for capacitor replacement. Regular readers of the column have been through this process with me a few times already, and I won't dwell on it. Suffice it to say that, to avoid making wiring errors, it is crucial to replace these one at a time. And in cases where it would be difficult to wire a new capacitor onto a terminal lug – or if the terminal lug is buried and can't be reached – a good workaround is to butt-splice the new capacitor's lead to the old one using butt connectors such as Radio Shack's 64-3036A. These are designed to be used with a crimping tool, but they take solder beautifully and make a very neat job.

Don't become compulsive about replacing a paper capacitor with the *exact* value of the old one. For some reason, new capacitors may come with values stated to three decimal places. But for our purposes, we usually have a very wide tolerance. You certainly don't have to hesitate about replacing a .05 ufd unit with a .047 or a .02 with a .022! The tolerance in electrolytic capacitors (the ones in the power supply filter circuit) can be



Remounted main tuning capacitor. Dial drive system not yet in place. Front two mounting grommets (see text) can be seen. Right-hand grommet is original; smaller grommet at left is one of the replacements.



Newly-installed terminal strip (at upper left) holds the two replacement electrolytic caps and also provides a tie point to substitute for one that "disappeared" (see text). Volume and tone controls are at top of picture.

even greater.

For paper capacitors, voltage rating is not important as long as it is *at least* as large as that of the original. Electrolytic voltage ratings should be at least as large as that of the original and as close to it as possible.

I usually buy my replacement caps from Everett Hoard of Frontier Capacitor. He will ship promptly and accurately from a phone order billed to your credit card (\$20.00 minimum plus \$4.50 shipping). Phone Everett at 701 378-2341 or e-mail him for a flyer at frntcap@bektel.com.

While replacing the paper capacitors, I looked into the wiring irregularities I had reported on in the November column. The jury-rigged phono connection and switch was removed, and the questionable wiring in the B-minus circuit was investigated. Electrically the latter was according to the schematic, even though the junction point between a resistor and a couple of capacitors was tacked together in "midair" without benefit of a tie point. I couldn't find any sign of this missing tie point.

I also had to temporarily remove for servicing both the volume control and tone control po-

tentiometers. Both were gummed up enough that their shafts couldn't be rotated without pliers. Quite often one can find a small opening in the back cover of such a potentiometer through which pressurized control cleaner/lubricant can be squirted. But not this time; they were sealed tight.

Once the covers were off, the innards and shafts were liberally squirted and the shafts rotated several times until I was satisfied that they had been freed up and that the wiping surfaces were clean. More cleaner/lubricant was applied to the contacts of the bandswitch, and this control, too, was worked several times.

Finally, I needed to install a terminal strip to be used for substituting new below-chassis axial-lead electrolytics for the original can units. The cans would be left in place above the chassis for appearance. The new units are only a fraction the size of the originals, and for that I was very glad. Space is tight in that part of the chassis.

I found a long terminal strip having two mounting lugs about the same distance apart as the positive terminals of the old electrolytics. After disconnecting the old electrolytics and bending

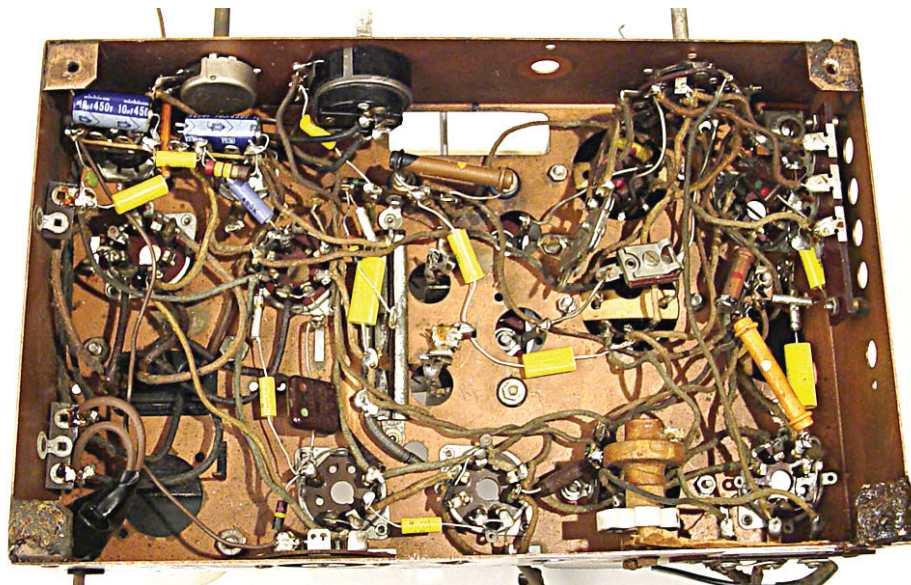
their terminals judiciously, they lined up well with the two lugs, and I was able to solder the lugs to the terminals for a very firm mounting. Of course the solder lugs associated with these mounting lugs could not be used for wiring – but there were still plenty of lugs on the strip at my disposal, including one that could be used to replace the mysteriously missing tie point described earlier.

The capacitance values of the two original electrolytics were 8 and 14 ufd. I replaced each of these with a 10-ufd unit. I would have used a 20-ufd cap for the one replacing the 14-ufd unit, but I didn't happen to have one on hand. If hum is excessive, I'm ready to parallel a second 10-ufd cap at that location.

I wound up this month's work session by replacing the variable capacitor (main tuning capacitor) previously removed for cleaning and lubrication. While the plates were blown out with liberal blasts of canned computer-cleaner air and I hand-cleaned some of the grimy surfaces with paint thinner and a rag, this unit will never look pristine enough to be in "grand prix" condition. However, I made sure the bearing surfaces were lubricated and cleaned using squirts of contact cleaner. I also cleared a couple of shorts in one of the sections by carefully straightening a bent plate.

The capacitor is through-bolted to the chassis using grommet-lined holes for vibration isolation. Each grommet has a little brass bushing to limit tightening to a slight compression of the grommet. Two of these grommets had rotted away, but I was able to find a couple that fit well in the chassis holes and also provided a snug fit for the bushings.

'Bye for now – more next month!



View under the chassis after completion of recapping project. The light-colored cylindrical and rectangular objects are the new caps.

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Radio Gone Berserk! Intentionally Wasting RF

There are several kinds of antennas and other RF devices which seem to be designed to intentionally waste as heat some of the RF energy with which they work. And conductors sometimes act more like insulators than conductors. Let's look into these strange phenomena.

❖ Sacrificing Signal to Improve Performance:

For the T²FD (terminated, tilted, folded dipole) of fig. 1A, one criterion is that the antenna should function with a relatively low feedline SWR over a very wide range of frequencies. If the T²FD were constructed without its resistor, the antenna would be a folded dipole. It's true that a folded dipole has a wider bandwidth than an ordinary dipole, but its coverage is still essentially limited to one band. If we use a folded dipole at frequencies too far removed from its design frequency, its feedpoint impedance will vary greatly, leading to some very high feedline SWR values.

However, we do cut the T²FD, and insert a resistor as shown. RF energy reaching that resistor – energy which would otherwise cause high SWR values – is dissipated as heat. The resistance of the resistor is also a factor in determining the antenna's feedpoint impedance. As a result, the SWR remains relatively constant over a very wide swath of the RF spectrum.

Other antennas whose designs include sacrificing a portion of their RF energy via a resistor are the unidirectional V (fig. 1B); the unidirectional rhombic (fig. 1C); and the unidirectional,

single-wire Beverage antennas (fig. 1D). When not terminated with a resistor these antennas are bidirectional, receiving equally well from either of their two favored directions. When the antenna is terminated with resistance to ground, the signals coming toward the antenna from the end opposite the resistor travel along the antenna to the resistor and are dissipated as heat in the resistor and the ground. Signals from the other direction travel along the antenna toward the feedline, and on to the receiver's input.

❖ More Power-Sacrificial Devices

Certain adjustments to transmitters should be made without allowing significant amounts of signal to radiate. For instance, when tuning a transmitter's circuits, unnecessary interference can be caused by allowing the transmitter's output to radiate from an antenna. In such cases, devices called "dummy loads" or "dummy antennas" (fig. 1E) are useful. In these devices a shielded resistor is used in place of the regular antenna. The shield acts to prevent the relatively-small amount of radiation launched by the resistor from radiating beyond the shield.

Another device for preventing unwanted antenna radiation is the "antenna cap." These caps are made of metal, lined with material which absorbs RF and converts it to heat. Covering antennas of modest or small size with such a cap can be a practical means of preventing unwanted radiation into space, even though the antenna is radiating full power inside the cap. RF absorptive material is also sometimes used to prevent reflections from surfaces near an operating antenna, such as on aircraft. The material can absorb potential reflection which would affect the antenna's radiation and reception pattern.

Attenuators are also power-sacrificial devices. They are used to reduce the strength of a signal when it is of greater strength than can be handled by the equipment being utilized. In the typical attenuator, a portion of the signal is dissipated as heat in resistance in the attenuator; the remaining portion of energy is routed on for use.

❖ Sacrificial Feedlines and Wave Guides

Feedlines with excessive resistance losses dissipate as heat significant amounts of the RF they guide. Recall that the more power reflected back down the feedline from the antenna, the higher the feedline SWR-reading. If significant power is dissipated as heat in a lossy feedline, then relatively less is available to be reflected. The resulting, deceptively-low SWR reading can make a poor feedline-antenna match appear acceptable.

Surprisingly enough, loss of RF power in lossy feedlines is desirable in some applications! For instance, some terminated rhombic antennas utilize intentionally-lossy feedlines as their terminating resistor. Several different methods are available for making dissipative-loss devices using coaxial cables or waveguides. Most methods use a resistive material for the conductors in open-wire line, or for the center conductor in coax, or positioned within a waveguide.

❖ Sacrificing Power Just to See a Pretty SWR Value?

When transmitting there is a simple way to obtain a relatively constant, seemingly-acceptable feedline SWR across a very-wide frequency range. This technique uses a resistor connected in parallel with the feedpoint terminals of the antenna (fig. 1F). Sometimes a balun is included. A resistor of appropriate value tends to even out the excursions of SWR which the antenna would otherwise produce when used across a very wide range of frequencies. There can be very significant power loss in the resistor.

A more serious problem is that the attached antenna can be extremely ineffective, or even missing, and the SWR will still look good! It's the resistor that's consistently well-matched, not the antenna. That sounds a lot like a dummy antenna. November 1984 *QST* carried a very interesting report (available at their website) on a commercial version of such a device.

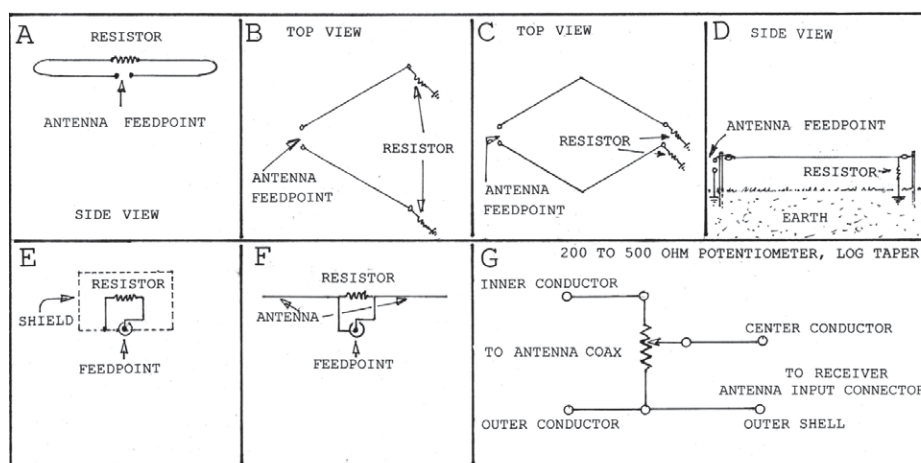


Fig. 1. A T²FD (A), a terminated-V (B), a terminated rhombic (C), a terminated Beverage (D), a dummy load (E), a low-SWR producer (F), the schematic for a simple variable attenuator (G).

A well-done overview of antennas:
<http://www.tmag.com/tutorials/antennas/antennas.htm>

◆ **Build Your Own Power-Sacrificial Device**

Among the signals coming from an antenna there may be excessively-strong signals whose frequency is within the bandpass of the receiver's front end. These excessively-strong signals can cause intermodulation distortion or desensitization. An attenuator will reduce the strength of all signals coming from the antenna. The value in this is that excessively-strong signals can be weakened to the extent that they no longer cause problems for receiving the other, also-weakened signals.

If your receiver has no attenuator, you can make a simple, yet effective attenuator using only a potentiometer connected as shown in fig. 1G. The antenna is connected across the potentiometer's resistance, and the sliding arm of the potentiometer is set at a point along that resistance to provide the appropriately reduced RF portion of the incoming signals to the receiver. When there are no excessively strong signals causing a problem, the attenuator should be set for maximum signal strength, or, better yet, disconnected from the system.

Incidentally, a power-sacrificial variable resistor attenuator similar to the one described here is used to control audio-volume level in most audio amplifiers, radio receivers, and TV receivers.

RADIO RIDDLES

Last Month:

I asked: "Is it possible to connect a conductor across a feedline or other source of RF, and expect that conductor to act like an insulator?"

The answer is "yes" if the conductor is shaped and dimensioned to be a quarter wavelength of feedline for the frequency at which it is utilized. It must also have an electrical short circuit across its end away from the line to which it is attached. A shorted, quarter wavelength of transmission line will transform the low impedance of the short to an extremely high impedance across its open end. Insulators, of course, offer extremely high impedance to electrical current.

Connecting the extremely high impedance of the open end of the shorted, quarterwave line to a feedline is essentially like connecting an insulator to the feedline. This fact is exploited at VHF and higher frequencies by utilizing U-shaped metal feedline supports. The sides of the U shape are dimensioned to be a quarter wavelength of transmission line, and are shorted by the bottom of the U. Such supports are called "metal insulators!" I suppose they could also be called "insulductors" or "conductulators."

Now let's connect a low-resistance inductor (coil) and a capacitor with good insulating dielectric in parallel across a source of RF. We'll choose the coil and capacitor so that they are resonant at

(tuned to) the RF signal's frequency. Although the coil in the resonant circuit is a conductor, the extremely high impedance of the combined coil-capacitor circuit behaves more like an insulator to the signal than a conductor!

The conductors used with RF chokes offer a low resistance path for DC current. Yet, with their very high inductive reactance, chokes offer a very high impedance to RF current. This "RF-insulating" capability of the choke can be exploited to power an antenna-signal amplifier installed outdoors at an antenna's mast. DC is fed to the feedline through a choke at the power supply indoors, and taken off to power the amplifier through a choke at the antenna outside. Due to the chokes, the DC circuit doesn't significantly affect the RF on the feedline.

This Month:

On HF and lower frequencies, which of the following would typically result in the best-quality reception at your receiver: a loss of 10 dB in the transmission line of the transmitter sending the signal you receive, or a loss of 10 dB in the transmission line of your receiving antenna? Or would both cases have identical results? Hint: Think of signal-to-received-noise ratio; it essentially determines quality of reception on HF and lower frequencies.

You'll find another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

Radio Shack PRO-95 Scanner

The Radio Shack PRO-95 is a portable, 1000 channel scanner, built in China by GRE for Radio Shack. It is a newer version of the 300 channel trunk-tracking PRO-93. Radio Shack sent us a PRO-95, s/n C011921, fitted with version 1.00 firmware and bearing date code 08A02 (August 2002). We viewed the firmware version by pressing the 3 key while the welcome message is visible, shortly after power up.

One of the most blessed traits of the PRO-95 is that it may be powered by four AA alkaline batteries. You don't need to spend lots of money on proprietary battery packs. The PRO-95 is furnished with two battery trays, a black colored tray for alkaline cells and a yellow tray for rechargeable batteries.

You may power the scanner using an optional 9 VDC 300 mA wall wart. The wart will recharge the batteries if you employ the yellow battery tray, which has a special charging contact.

❖ Frequency Coverage

The PRO-95 receives AM and FM signals on the most popular scanner bands plus Citizens Band, 216 - 220, and 1240 - 1300 MHz. The current crop of Radio Shack scanners do not tune the 225 - 400 MHz military air band. Military air band monitoring became more important after September 11, 2001 due, in part, to the Combat Air Patrol missions flying over major US cities.

Like the PRO-2053 (see May 2002 *MT*), the PRO-95 tunes the 137 - 174 MHz band using factory-selected steps of 5, 6.25, or 7.5 kHz, and the user cannot change the step size. As a consequence, you cannot directly program frequencies like 160.000 MHz because the radio coerces the entry to the closest FCC allocated channel of 159.9975 MHz. The VHF-high federal assignments, e.g., 165.2375 MHz, are coerced as well.

❖ Memory and Modes

The PRO-95's 1000 memory channels are divided equally among 10 banks. The scanner alerts you when programming a channel with a frequency which is already programmed into another channel in the same bank, though no duplicate warning is given if the same frequency exists in a different bank.

Each channel has a mode: AM, FM, MO (Motorola trunked), or ED (EDACS trunked). The PRO-95 does not support LTR trunking, CTCSS and DCS squelch. You may choose between AM or FM mode, which is handy when

scanning military activity adjacent to the 2 meter ham band because the military employs both modes within the same band.

For trunking purposes, a memory bank must be designated as MO or ED. You can mix conventional and a trunked system within the same bank, but you cannot use a bank for both Motorola and EDACS trunking.

The PRO-95 has a total of 10 talk group ID banks and each one contains 5 sub-banks. Each sub-bank can hold 20 IDs.

You can program a 12-character label for each memory bank and each memory channel. Both the channel label and frequency are displayed simultaneously when stopped on a channel. A defect in the PRO-2053 and the PRO-93 version 1.00 firmware caused some of the labels for channels in banks 0 and 1 to be overwritten by the labels from banks 8 and 9. Our PRO-95 doesn't have this problem.

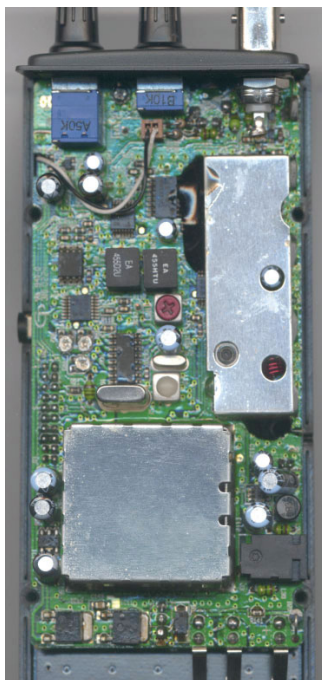
The PRO-95's attenuator setup is more flexible than most scanners. The attenuator can be enabled on a per-channel, per-search bank basis or globally.

The display backlight is flexible, too. The backlight can be set to time out after 3, 5, 10, or 20 seconds, or latched on.

❖ Scanning and Searching

The PRO-95 scans a mixture of both conventional and trunked systems very well, with no perceptible hesitation when switching between banks. This radio is quick, too. We measured a 42 channel/sec scan rate (conventional) and an 87 step/sec search speed.

Memory banks may be scanned in open or closed mode, a distinction which makes sense only for trunked systems. When



scanning trunked systems in the closed mode, the talk group lists are used as filters to tell the PRO-95 which talk groups to ignore and which to monitor. In open mode, the PRO-95 will stop for conversations in any talk group.

There is only one pair of user programmable search limits. There are preprogrammed service search banks for VHF-marine, citizens band, police/fire, civil aviation, and ham radio. CB and marine channel channels are displayed as well as frequency. The police/fire and ham banks are further divided into sub-banks by frequency. Therefore, you can choose to limit your search to preprogrammed VHF-low band police/fire, 2 meter hams, etc.

A single priority frequency may be sampled approximately every two seconds. Priority sampling is irregular when scanning trunked systems because the PRO-95 will not interrupt a trunked transmission to sample the priority channel.

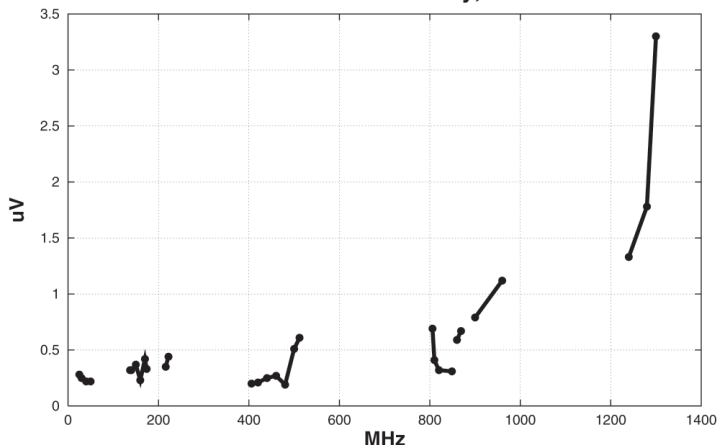
❖ Manual

New, helpful notes, printed in the margins, make the PRO-95's user manual easier to understand than prior manuals. However, the manual is only 3-3/4 inches wide and difficult to hold open while reading.

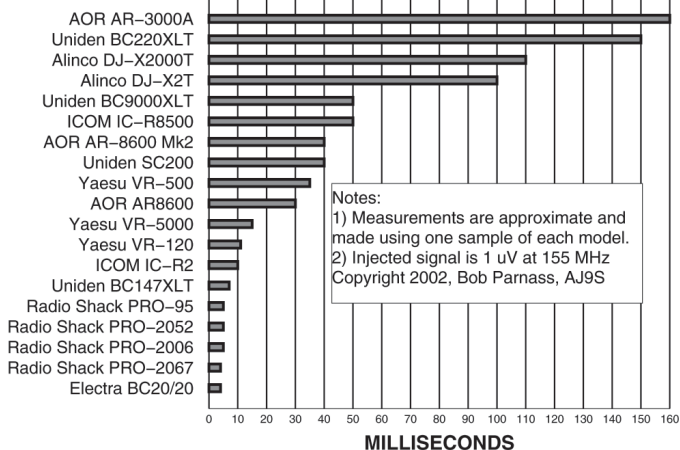
You can download a copy of the user manual from: http://support.radioshack.com/support_electronics/doc69/69487.pdf and print it out so you won't have to fight with the binding.

Both the PRO-93 and PRO-95 manuals contain a mistake which calls for the wrong size plug for the AC adapter. The manual specifies a size C instead of the better fitting size B (pg. 12).

Radio Shack PRO-95 NFM 12 dB SINAD Sensitivity, s/n C011921



SQUELCH TAIL LENGTH



Measurements

Radio Shack PRO-95 Scanner
Catalog #20-525
S/N C011921

List price \$249.99

Radio Shack Corp.

Ft Worth, Texas

<http://www.radioshack.com>

Frequency coverage (MHz):

- 25 - 54 (5 kHz step)
- 108 - 136.9875 (12.5 kHz step)
- 137 - 174 (5, 6.25, 7.5 kHz steps)
- 216.0025 - 221.9975 (5 kHz step)
- 222 - 225 (5 kHz step)
- 406 - 512 (6.25 kHz step)
- 806 - 823.9875 (6.25 kHz step)
- 849 - 868.9875 (6.25 kHz step)
- 894 - 960 (6.25 kHz step)
- 1240 - 1300 (6.25 kHz step)

Modes: AM, NFM, user selectable

NFM modulation acceptance: 12 kHz

Attenuator:

- 19 dB @ 155 MHz
- 16 dB @ 460 MHz
- 12 dB @ 860 MHz

Intermediate Frequencies (MHz):

- 380.8 (approx), 21.4, 0.455

Audio output power, measured at earphone jack:

- 125 mW @ 10% distortion

Squelch tail near threshold (1 uV @ 155 MHz): 5 ms.

Current Consumption (mA):

- 0, off
- 74, scanning
- 128, open squelch, max volume

Shutdown at 3.96 VDC, without warning

Practical memory scan

- Speed: 42 channels/sec. (non-trunked)

- Search speed: 87 steps/sec.

Performance

The PRO-95's speaker audio is good and loud and it was the first thing we noticed when putting the scanner into service. We measured 125 mw of power at the earphone jack. Audio at this jack is purposely attenuated for use with an earphone.

The squelch control has a moderate amount of hysteresis. We measured a 5 ms squelch tail, or noise burst as the squelch closed at the end of each conventional transmission. As the accompanying chart shows, the PRO-95's squelch tail is among the shortest we've measured and that's good.

Software

Programming the PRO-95's 1000 channels, text tags, and 1000 trunk IDs entirely through the radio's keyboard could require days of tiresome effort. A computer equipped with the proper cloning software would make the task so much easier. Though the PRO-95 is fitted with a serial interface jack, commercial software is not available at the time this review is being written.

As a rule, manufacturers have been unwilling to freely furnish the information required to write a cloning program. GRE made writing software for the PRO-95 and earlier PRO-93 even more difficult through encryption. Luckily for PRO-95, PRO-93, and PRO-2053 owners, Don Starr, Bill Petrowski, and Ken Plotkin have solved the puzzle and offer free Win93 and Win95 cloning software at the <http://www.starrsoft.com> web site. Their software requires a Microsoft Windows operating system and the proper interface adapter cable to connect the scanner and computer.

Meanwhile, there is no native cloning software for Linux and Mac computer users.

Overall

We were impressed with the PRO-95's performance when scanning a mixture of trunked and conventional signals. The audio is very good and the text labels are an excellent aid for those of us who have trouble remembering hundreds of different frequencies! Its AA battery arrangement is preferable to a monolithic, proprietary pack.

We would like to be able to lock out talk groups while searching a trunked system in open mode for new talk groups, a method the PRO-95 does not support.

Radio Shack should publish the information required to write cloning software for the PRO-95. It would make the PRO-95 more attractive if buyers had a choice of software.

Radio Shack scanner fans are still waiting for a new model with CTCSS/DCS squelch, LTR trunk tracking, and 225 - 400 MHz military air coverage.

NOTICE: It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/service company engaged in cellular technology.

Full 800 MHz Scanners



AOR AR-8200MKII
Wideband portable receiver

- 0.5 to 2040 MHz continuous. (unblocked)
- NFM, WFM, NAM, WAM, USB, LSB & CW
- Alphanumeric memory identification
- Spectrum scan
- Computer control
- Flexible dynamic memory
- Optional CTCSS & Extra memory boards

\$699^{us}



ALINCO DJ-X2
Credit Card Wideband portable receiver

- 0.5 to 999 MHz continuous. (unblocked)
- NFM, WFM, AM - 700 memory channels
- Lithium Ion Battery
- RF detector (Bug finder)
- Menu system
- Weighs 7 oz, 15mm thin, SMA connector

\$269^{us}



ICOM IC-R3 (unblocked)
"Portable receiver with built-in TV receiver!"

- Modes of operation AM, FM, WFM, AM
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- 450 memory ch, 6 character alphanumeric
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New Products from 30 Year Old Technology

Over the years I have found myself managing a number of "repeat" technologies at electronics companies: flat panel displays (LCD), high speed semiconductors, and solar cells. Each of these technologies has come in and out of fashion at least twice in my career.

Well, now solar cells are back! In the 1970s I was doing research on the commercialization of single crystal and ribbon silicon solar cells. Solar cells had been used for years in space applications. However, the energy crisis of the 1970s had unleashed a large body of work on low cost terrestrial applications of solar power. Our research centered around getting the conversion efficiency factor high enough so that you did not need a cell the size of a football field to power a radio. The solar efforts were never commercially realized and faded with our memories of thirty-nine cent per gallon gasoline.

In the 1980s I again managed a development effort in solar cell manufacture. This time we utilized a material called amorphous silicon. When coupled with the newly developed, low power CMOS semiconductor technology, this time solar power was a commercial success. Just look at all the solar powered calculators that resulted!

◆ Two for the Sun Lovers

In January, for us in the Northern Hemisphere the sun seems like a dream from last summer. Okay, so we are not exactly in the land of the midnight sun or six months of darkness. But it sure feels like it. However, there is a new solar powered AM/FM stereo headphone radio that might warm your heart. See Figure 1.

Made by Soltronix, the HR-1 radio, which utilizes NiMH battery technology, operates for more than 20 hours on a full charge. One hour of charge provided me almost 2 hours and 34 minutes of listening time. The play-time will be a function of the volume level.



Figure 1 – Sun Powered AM/FM Headphone Radio by Soltronix Provides 20 Hours of Play on a Charge

The headband-mounted solar cells module seems more flexible and durable than most solar cells. The info that comes with the radio says that it is "Powered by Iowa Thin Film Technologies." I assume this refers to the maker of the solar cells and the manufacturing process they utilize. It comes with a three-year warranty on the solar module.

The internal FM antenna did a pretty good job in my rural listening area. Overall, the radio had average sensitivity on both AM and FM. Sound quality was above average with what seemed to be a wide audio frequency range, especially in the bass region. The model HR-1 sells for \$34.95 from Cyberguys <http://www.cyberguys.com>, my source for all these accessories.

◆ iSUN

What if someone packaged two solar panels in a convenient handheld foldable case? Included lower current drain regulators for a stable output? And then added to this a number of jacks so it can connect to the external power jacks of radios and the like? Well, we have just described the iSUN by ICP Global Technologies. See Figure 2.

Each iSUN unit can supply or charge up to 2 Watts of power for cellphones, scanners and other portable electronic devices. Much thought has been put into its mechanical design. To accommodate higher power requirements, multiple units fit together in a daisy chain fashion.

The iSUN has a switch that allows the user to select between 6 and 12 volts output. The double-sided single sheet of instructions is a bit ambiguous by stating "Select the 6V position when connecting to electronics requiring 6V or less ..." This makes me a little worried about the voltage regulation. Perhaps it is self-regulating due to a current limiting effect of the batteries installed in the equipment. However, I'm not ready to risk it. So I'll stick to 12 volt and 6 volt equipment.

Although the iSUN is billed on its box as "helping run" electronics, this may also be a bit



Figure 2 – iSUN Portable Solar Charger by ICP Global Technologies

misleading. The iSUN is actually a solar battery charger. A powerful one, supplying 290ma @ 7.6 volts or 145ma @ 15.2 volts, but still basically a charger.

Lots of different type of plugs comes with the unit, including one that allows a standard 12 volt cigarette lighter plug to be connected to the iSUN. Polarity of the connecting plug is also user selectable.

You can check out their website at <http://www.icpglobal.com>. The price at Cyberguys is \$69.99.

◆ Simple, But Very Useful

Talking about 12 volt cigarette lighter plugs brings to mind another useful product. Made by Wagan Tech, this tiny box (about 4-1/4" x 2-1/4" x 2") plugs into an electrical outlet and has a built-in receptacle for a cigarette lighter plug. It supplies 12 volts DC at 1 amp for any electronic device, such as a scanner. See Figure 3.

I'm always a bit skeptical about the quality and regulation of the DC power produced by small plug-in power supplies. Many have no regulation and little conditioning. The result can be wildly fluctuating voltages and lots of AC

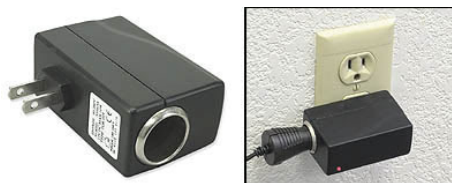


Figure 3 – Wagan's Tiny 12 Volt Plug-in Power Supply

component on the DC voltage. As a rule of thumb it's best to use most small power supplies well below the stated maximum current limit.

Therefore, although the unit states "12 volts at 1 Amp DC" I suggest that you use it with equipment that requires around 0.5 to 0.7 A.

The Wagan's ultra small size makes it a natural for powering pocket scanners, portable short-wave radios, cellphones and tape/CD players on the road. I've made mine a permanent part of my overnight travel bag; which of course also includes an equally tiny handheld wideband receiver. At \$8.95 the price matches its size.

◆ Talking About Traveling

I spend a good amount of time in airports. One thing you notice is how many people are using Palm Pilots, Pocket PCs and tiny laptops. Are they being used for data processing? Of course. But they are also "boredom processing" devices. You can read the newspaper just so many times!

You can tell these people by the delicate and exacting manner in which they hold their finger or stylus, which is required by the tiny keyboards. The whole process resembles a dart-throwing contest!

The Fold-2000 foldable keyboard may be an answer for some. This product is another "repeat technology" product. How many of you remember the Atari 400 computer? If you do, you're showing your age! To save cost, the 400 had a membrane keyboard, which had no movable keys. Instead it utilizes a rubber-like material impregnated with carbon. When the material is pressed its resistance decreases. In other words, it makes a connection.

The manufacturer of the Fold-2000 has used a similar material to produce a full size keyboard for use by laptops. Due to its flexible rubber-like quality, the whole keyboard can be rolled into about a 3.5"x2" roll. The area that houses the electronics, 2.5 inches, limits its minimum size.

Overall, it is a nice accessory for some laptop users. I think that this \$29.95 product could have been more useful if it could also be used with Palm Pilots and Pocket PCs that, in most cases, have no keyboard.

◆ Cool Light!

The idea of producing light without heat is no big deal today. But until 1968 most people had never seen "cold semiconductor light." That was the year that Monsanto released the MV-50, the first commercially available light emitting diode (LED). Before this technological development, light sources were built around heated filaments (incandescent) or electrical dis-

charge which emitted light as a by-product.

The MV-50's light was produced by electron transitions in a semiconductor material. I have fond memories of my undergraduate days, sitting in a darkened lab with the whole physics department looking silently and in awe of the small red dot of light coming from the first MV-50 sample. With no filament to sputter to burn-out, we all knew we were looking at a light source that could burn continuously for over a decade!

Today, LEDs are common in everyday life. Car dashboards, scales, signs and desktop receivers all use LEDs. However, recently LED technology has been advancing in the areas of increased brightness and production of colors, including white light. Car companies are now using LED as spotlights. LEDs are even showing up in traffic signals where their long life is a safety factor. The INOVA Microlight utilizes both of these advances to bring to market a tiny white light flashlight than can be seen from over one mile away.

Figure 4 shows small size of the finger held Microlight model TML 2009. The beam appears as pure white and the brightness makes looking directly at the source painful. It is powered by two replaceable 3-volt lithium cells. Although lifetime of the LEDs are quoted as 110,000 hours +, the battery life is not stated. At \$9.95 the tiny Microlight makes a nice accessory to a handheld scanner pouch. Check it out at <http://www.inovalight.com>

◆ That's It For Now

I always have my eye open for innovative electronic products. I hope you find the same usefulness in some of these products around your radio shack. All of the above products are (or were) available at <http://www.cyberguys.com> or call 1-800-892-1010. Tell them you saw it in MT. Till next time, here's wishing you a happy and healthy 2003.

Outer Limits continued from page 73

QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14711; PO Box 28413, PO Box 69, Elkhorn, NE 68022; Providence, RI 02908, and PO Box 510, 4010 Basel, Switzerland.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. Best bets are *The ACE* (\$2 US for sample copies via the Belfast address above) and the e-mailed *Free Radio Weekly* newsletter, still free to contributors via niel@ican.net. The Free Radio Network web site, another outstanding point of content for pirates, is found at <http://www.frn.net> on the internet.

Thanks

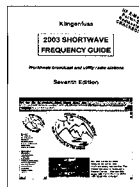
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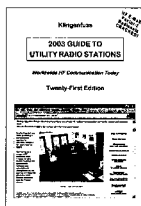


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Includes many HF E-mail Pactor-2 and GW-Pactor radionets that we have cracked! Here are the really fascinating radio services on SW: aero, diplo, maritime, meteo, military, police, press, and telecom. 10,100 up-to-date frequencies from 0 to 30 MHz are listed, plus hundreds of new decoding screenshots, abbreviations, call signs, codes, explanations, meteo/NAVTEX/press schedules, modulation types, all Q and Z codes, and much more! 594 pages • \$ 40 (worldwide seamail included)



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Figure 4 - INOVA's Microlight - The Size of a Car Key and Visible for a Mile!

MT

REVIEW

The Wavecom W40PC

By Lee Reynolds

The brotherhood of radio hobbyists covers a wide selection of enthusiasms and people. They range from those who like to listen only to the powerhouse broadcasters on the shortwave bands to those who experiment with cutting-edge DSP modes down in the 183 kHz range...

...then, you have those who, when asked by other hobbyists what aspect of the hobby they're interested in, are looked at nervously and edged away from. These are the people who describe themselves as "digital ute monitors" – those who like to monitor digital utility transmissions. This review is for them!

The device reviewed here is made by Wavecom AG (<http://www.wavecom.ch>) – a Swiss company located in Buelach, Switzerland. Privately held, they have been manufacturing digital signal decoders since 1985. Their approach has been that of creating DSP boards and software that is designed specifically for the task at hand rather than adapting PC hardware that already exists or using low-end external hardware interfaces (such as zero-crossing comparators – that's "dongles" to you and me)! Wavecom's customers range from governmental alphabet entities down to the high-end digital utility hobbyist.

The W40PC is their lowest-end decoder. Don't confuse "low-end" with "shoddy" – the W40PC is a well-designed and laid-out DSP device designed for use in the 16-bit ISA slot of a personal computer running Windows 95 or later. A Pentium 200 or better is able to properly support the card and its software. The device is designed to decode over 106 modes (subject to change) encountered on the air and provides a well-equipped software toolbox to aid in identifying those modes. Other decoder models available include the remotely controllable W41PC, the USB-connected W41USB and the new PCI-based W51PC.

❖ Installation and Exploration

Installation of the card is simple and re-

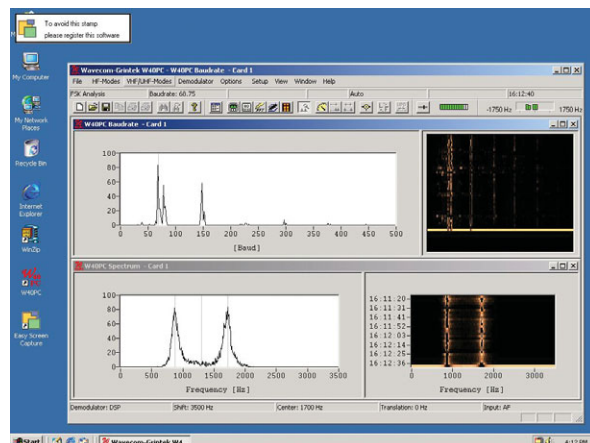


quires nothing more than setting the address jumpers on the W40PC card to an unused hardware address in your PC (if needed), plugging the card into the PC and installing the software. Hook up the line out of your receiver to the 'AF IN' BNC connector or the W40PC, configure the software to match your board's address setting and you're ready to go! A real nicety is the provision of additional signal inputs for a receiver's discriminator output and an IF-level input that can be set to any frequency between 16 kHz and 1.5 MHz.

The first thing that struck your reviewer about the user interface presented by the software was the care and thought that had obviously gone into its design. All tools and modes are readily accessible with just a few mouse clicks, it's clearly a package designed to function within a multi-tasking operating system – there's no messing about with DOS boxes trying to get something to work with this package! (One item under the heading of "eye candy" that I really liked is the ability to select different palettes for the tool displays – it makes interpreting things like waterfall displays much easier when various attributes are properly color-coded).

For test beds I used the W40PC in both a PIII/500 box with Windows 98SE and a dual CPU PII/333 system running Windows 2000. (Past experience suggests that if a hardware device is going to have problems, the most expedient way to cause it to do so is to run it under Windows 2000. Everybody writes for Windows 98, far fewer tackle Windows 2000!) Signal sources ranged from an ICOM R-75, Radio Shack Pro-2006, and JRC NRD-525 to the Klingenfuss and Wavecom digital signal libraries on CD-ROM. Testing of AF, Discriminator and IF-level inputs was also undertaken.

I did a little rummaging around in the W40PC signal analysis toolbox first of all and came up with a respectable selection of goodies. Autocorrelation, Bit Correlation, Bit Length, MFSK Signal Analysis, PSK Signal Symbol Rate and Phase Plane Analysis, FSK Analysis, FSK Code Check (an automated signal identification tool), Real Time FFT, Sonogram, Waterfall, Oscilloscope and combined FFT/Sonogram all go to make up a very usable "Swiss Army Knife" toolkit for the monitor. An additional SELCAL



Analysis mode is available for certain VHF/UHF modes.

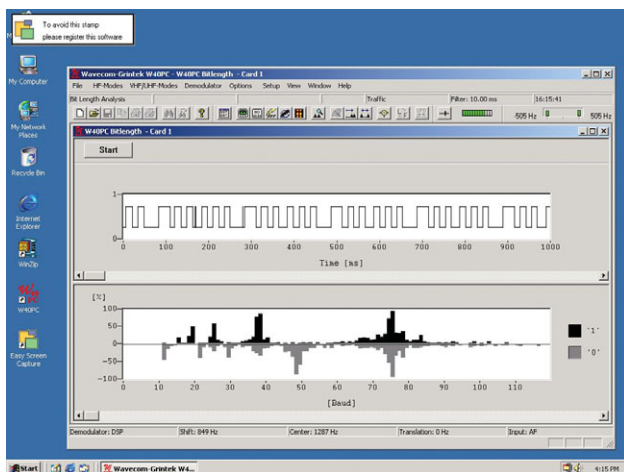
❖ Signal Testing

Initial testing of the analysis tools was undertaken by feeding the W40PC with known signal types from the CD-ROM sources and then comparing W40PC indicated signal characteristics with what the known characteristics of the signal should have been. (For example, Autocorrelation was quite usable for determining if a signal was encrypted/randomly masked or not by revealing the presence or absence of any recognizable bit patterns.) All tools performed as expected with the exception of the FSK Code Check module, which sometimes seemed to take an excessively long time to suggest a mode. (Note: Any signal identification system on hardware that even the high end utility monitor can afford is a "good guess" at best – a knowledgeable operator is far and away the best way to identify a mystery signal).

Feeding known signals from a digital source to the card again, began testing of the W40PC's ability to receive various modes. Older, lesser-used and known modes (such as CIS-11 and HNG-FEC) were used as well as systems currently in wider use (PACTOR II, PSK31, ACARS, ARQ-E3). All were received with equal facility. Baud Rate, Shift and Center determination buttons all worked as they should, yielding quick identification of the basic parameters of a signal prior to actual decoding.

❖ On the Air

Testing of the VHF/UHF modes (PACKET, ACARS and others) worked well, I had the unusual pleasure of feeding a high-speed



data signal into the W40PC via the tapped 455 kHz IF output from one of my Pro-2006 scanners. Discriminator, AF and IF input methods all worked well where applicable. All modes worked well except for one (with an effective signaling rate of 6400 bps), which missed approximately half the traffic cycles due to a decoding module that still needs a little tweaking. Wavecom are aware of this defect and are working to fix it.

A rare ability of interest to the fanatical trunked system monitor is the W40PC's ability to decode MPT-1327 systems (of which there are a few in the USA). On HF performance was excellent, signal characteristics analysis being fast and accurate more than 85% of the time. Automatic mode identification was less certain, identifying the simpler modes with good speed and accuracy but the more complex the mode the slower the process. Wandering around the amateur, maritime and other band segments was an enjoyable task; putting the card through its paces was a pleasure.

One strength of the W40PC, when it comes to displaying foreign text transmission, is the very wide range of foreign alphabets it can handle. Multiple flavors of ITA, Cyrillic, Greek, Arabic, Hebraic and Scandinavian alphabets can be selected and displayed. This puts a nice tidy end to the old practice of having to use third-shift display of some non-Latin alphabets in order to decode what you're seeing. One prob-

lem noted is that ALE (MIL-188) decoding is broken in the current software version. Again, Wavecom are aware of this fact and are working to fix it.

As a matter of personal interest I then took the radio down into the LF portion of the spectrum to see what it could do with DGPS signals. In the last few years a great many non-directional beacons between 280-325 kHz have been converted to the transmission of DGPS data (for fine corrections to GPS signals where a user is so equipped and they've effectively been lost

to the LF enthusiast as a source of identifiable loggings.) The W40PC did a fine job of decoding even the weaker DGPS signals. I'm happy to say that what had become a source of annoyance to me is now a source of interest (and loggings) once again.

Another signal type to be found on LF is that of NAVTEX on 518 kHz. No problem!

Observations

As you can tell, I like this device. I liked it well enough to have purchased one some months ago. I have a reasonably wide experience of digital transmission decoding hardware (Hoka, Universal, et al) and the Wavecom is my firm favorite, because it offers an excellent compromise between quality, features and cost.

One big plus for this device, in my opinion, is that software updates are reasonably regular and, importantly, *free*! Wavecom exhibit a mentality that takes into account the low-end purchaser, not just the corporate/governmental buyer. This compares extremely favorably with a

competitor's offering of a 3.5" diskette with the latest software upgrade for their hardware for a mere \$US 400. I may be crazy enough to be a digital utility monitor but I'm **not** crazy enough to pay that kind of money for a (merely) incremental software upgrade as well!

The only real disappointment encountered with the W40PC is the fact that there are no plans to implement an HFDL decoding module for any of their product line apart from the newest product – the W51PC. (Not to worry, Charles Brain's fine software decoder will fill that gap for me!) Documentation is fairly good, but you also need to download and print the W41PC user's guide as well, because it covers additional relevant topics lacking in the W40PC manual.

If you're in the market for a high-end decoder, I can definitely recommend the Wavecom line of products. Not only are they well designed, they're well supported *and* Wavecom honestly admit to any problems you may encounter, happily working with you to resolve the matter. Feature set and cost is only half the value here – a manufacturer that acknowledges the hobbyist's existence is the other.

Now, if I could only afford the W51PC.....

Note: The Wavecom W40PC is \$1,895 from Grove Enterprises 1-800-438-8155; the W51PC is \$5,295. Unfortunately, because the units decode certain paging modes, they are not legal for consumer sales in the US, but can only be sold to qualifying agencies.

— SCAN • A • MIX — BX1 —

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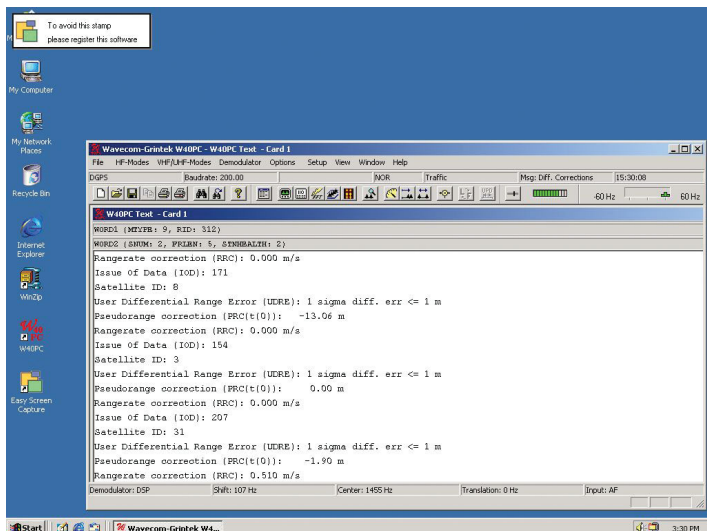


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A New Use For DSS Diplexers

By Dale Parfitt

As we built our North Carolina log home, I thought I had anticipated all of the coaxial cable runs I would require: multiple amateur radio runs into my office, satellite RG/6 to every room etc. Not long after setting up my shop I realized I needed a dedicated cable for a shortwave antenna. Even though we had a single DBS (direct broadcast satellite) receiver, I had run two RG6/U coaxial cables from the DBS dish into the basement. So, the unused run was borrowed for shortwave use. This was fine for a couple of years until my wife decided she had had enough of watching *Leave It To Beaver* and *Andy Griffith* every night, and wanted her own receiver. There went the cable for my shortwave receiver.

I dreaded the thought of trenching and laying new cable in underground PVC pipe. I started thinking of an alternative. Block down frequencies for satellite reception are above 1 GHz. Why couldn't I multiplex my shortwave signals on the same coaxial cable I had been using? A quick trip to Walmart produced a pair of RCA DBS diplexers. A diplexer is a device (usually, but not necessarily passive) that contains a low pass filter (LPF) and a high pass filter (HPF). One end of each filter is connected together, yielding a 3-terminal device – see Fig. 1.

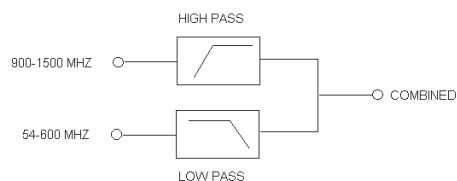


Fig. 1: Block diagram of a DBS diplexer

In the case of the DSS (digital satellite system) diplexer, one port is for a VHF/UHF television antenna, another is for the DBS block down frequencies and also passes DC power to the DBS LNB. The third port is the combined signals. The diplexer is bilateral – that is, it can also be used to separate the above signals.

A test on my network analyzer showed the VHF/UHF input (the low pass filter) had a worst case loss of under 2dB from 4.5 MHz to 900 MHz! Below 4.5 MHz it began to roll off quickly and was down 17dB at 300 kHz (the lower limit of my analyzer). See Fig. 2A

This was almost acceptable as is, except I do enjoy chasing the nondirectional LF beacons, and they would be severely attenuated by the stock diplexer. Remember, a pair must be used – one at either end of the cable. This meant LF

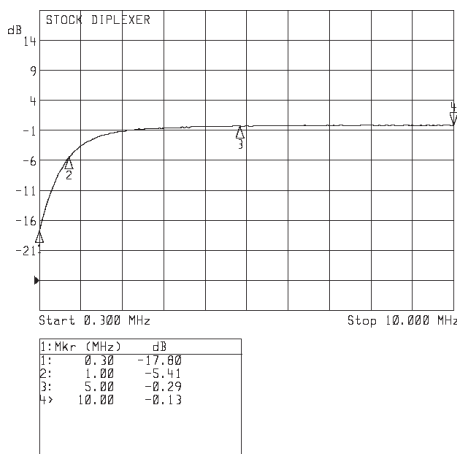


Fig. 2a: RCA diplexer unmodified would be down 34dB.

I said before that a diplexer consists of a low pass filter and a high pass filter. A simple diplexer is shown schematically in Fig 3A. The low pass filter should have very low loss right down to DC. But a DBS diplexer must also steer the DC voltage from the DSS receiver to the DBS LNB. In these diplexers an RF choke is placed from the HPF input to the combined output to allow the LNB voltage to pass, and a DC blocking capacitor is inserted in series with the LPF to block the LNB voltage. This cap must be the culprit accounting for the low frequency rolloff of the diplexer. Look at Fig 3B to see how the DBS diplexer differs from the conventional one in Fig 3A.

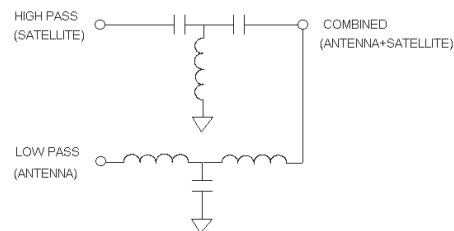


Fig. 3: Classical diplexer

I drilled a small hole in one corner of the back plate and used a thin screwdriver to pry the back plate off. Once opened, a quick inspection confirmed the existence of the series cap. See Fig. 4A. In the RCA diplexer it is a .001uF disc cap. Others use a .001 chip capacitor.

I paralleled a 0.1uF cap with the .001 and reinstalled it on the network analyzer. See Fig.

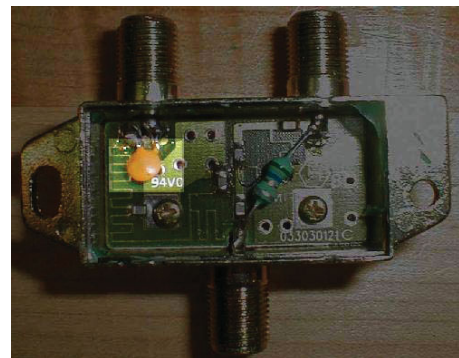


Fig. 4a: Stock RCA diplexer



Fig. 4b: Diplexer with addition of 0.01 uF cap and split chokes

4B. Loss at 300 kHz was now an acceptable 4dB. See Fig. 2B. This modification in no way alters the other characteristics of the diplexer. Use leads as short as possible. The inductance

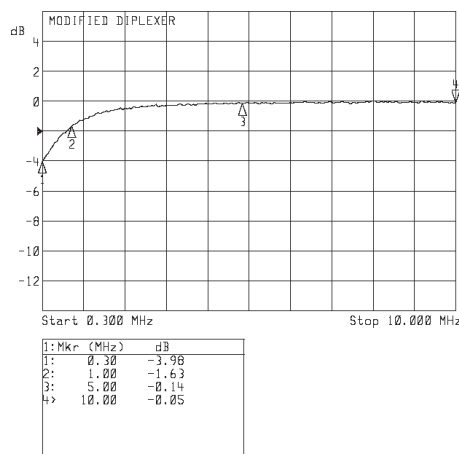


Fig. 2b: RCA diplexer modified with 0.01uF cap. Note change in vertical scale from 2a.

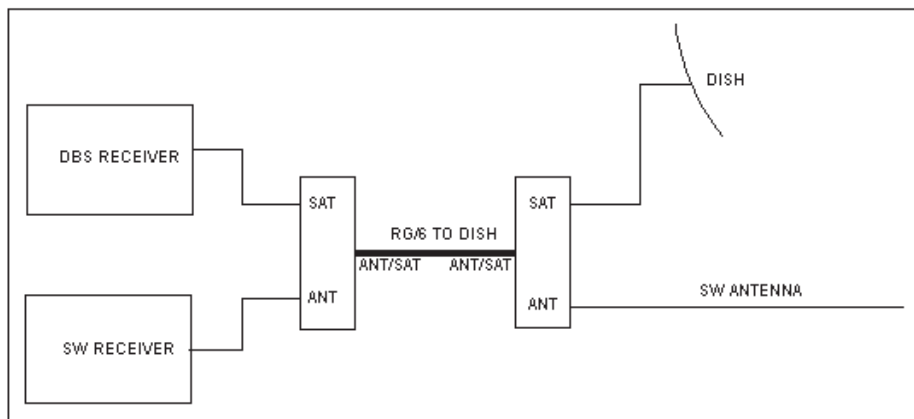


Fig. 5: Incorporating the diplexers into the satellite & SW antenna system.

of long leads can form a parallel resonant trap that will cause a dip in response around 30 MHz. A new back plate was made from thin aluminium stock and epoxied in place. Alternatively, the diplexer may simply be potted with epoxy.

Fig. 5 is a block diagram of how the components are connected together. Note that the SW antenna should represent a low impedance to the diplexer. If a random wire is used, performance will be improved by using a 9:1 transformer. The shortwave antenna's performance is identical to what it was when it was the only user of the RG6/U coaxial cable. Make sure to use appropriate grounding at the dish end, as

the addition of the shortwave antenna may increase the possibility of a lightning hit.

Because the VHF/UHF input was flat to 900 MHz, this same technique may be used to add a scanner antenna to an existing satellite run; without the need to modify the diplexer's low end response.

In actual use, it was found that the satellite receiver emitted fairly strong broadband noise below 2 MHz. The obvious path was through the DC passing choke from the Satellite Input to the combined output. This choke (green axial leads in Fig. 4A) was removed and replaced with a pair of 40uH chokes (upper left Fig. 4B) only on the diplexer inside the house.

This resulted in a substantial reduction. Finally, by placing a 100uF @25WVDC from the intersection of the two new chokes to ground, the noise was virtually eliminated. For listening above 2 MHz this second modification was not seen as necessary.

Another solution would be to temporarily unplug the DSS receiver while listening to SW. Turning the DSS receiver off is of no help, as it continues to "talk" to the LNB at the dish.

❖ Conclusion

At this writing, my local Walmart is no longer carrying the RCA diplexer. Radio Shack is still a source. An Aspen brand diplexer D-2100LX was inspected. Although it used a slightly different topology, the series DC blocking cap was also present although at a different location. Paralleling it with a 0.01 uF cap as in the RCA model yielded identical performance. Work continues in an attempt to further reduce DSS receiver noise below 1MHz. For now, however, I have my SW antenna back and my wife has her HGTV.

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Plantronics' Amazing CT10 Cordless Headset Phone

Got an aching neck? You might be able to cure it with a very unusual therapeutic agent. I'm not talking about magnetic bracelets, an herbal concoction or some New Age crystal gizmo. You don't even have to visit your local HMO or witch doctor. No, the miracle cure I'm talking is a fairly common electronic device that may well be available in your local office supply store or perhaps discount center.

But before we get to the heart of this story, we have to travel back in time, about a decade or so, to when I was employed in a high tech public relations firm. One of my duties there involved contacting a lot of editors by telephone during publicity campaigns. One morning, in the middle of one of these campaigns, I came into the office complaining bitterly of a painfully sore neck. "I just don't understand it," I said to my office partner.

"I do," he said, "you spent seven hours yesterday doing this." Then he scrunched his shoulder up to his ear the way you do when you're trying to hold an ordinary telephone in place without your hands. As soon as he said that, I knew he was right. Immediately I left the office and purchased a headset phone. Within a few hours, I had become a Born Again headset phone user. Not only is a headset my first choice for a telephone, but by now, I feel downright awkward when I use a conventional phone.

You see, a headset phone does more than free you from having to hold the phone in one hand or having to jam your shoulder to your ear. It allows you to sit with normal posture and to use both hands on a computer keyboard, to rummage through a file, or even to work on a piece of equipment while someone on the other end of the line walks you through the procedure. Headset phones are just plain more ergonomic and efficient than ordinary phones, and that's why you will find almost any telephone call center anywhere in the country populated with headset phones.

◆ A Better Solution

When I began my career as a fulltime freelance writer just over 5-and-a-half years ago, one of my very first purchases was a headset phone. Not only that, but it was a *cordless* headset phone. I wanted a cordless headset phone because there

was no phone jack in my office, and I didn't want the hassle of running the wires to install one. Once I located and bought a cordless headset phone, I found that would allow me to roam freely about the house while I talked, took notes on the computer, accessed equipment, fixed a snack or whatever. In short, I found that a cordless headset phone was substantially more wonderful than a wired headset phone.

In short time, I became a connoisseur of cordless headset phones. I tried models from GE, Radio Shack, and another company, but they all eventually failed. Sometimes they failed so quickly that I bought two phones in a year. There were two key reasons for failure. The first was that the wire connecting the headphone itself to the remote "box" would become intermittent. Since the headset wire was hardwired to the box and could not be unplugged, that meant shipping to the repair center for service. Usually it was more convenient to buy a new phone.

The second reason for failure was that the usable time on the rechargeable battery would become shorter and shorter until the remote would last only a few minutes until it had to be dropped

back into the recharging base. There was no convenient way to swap batteries when one became depleted, so battery management became an activity in itself.

◆ The Perfect Solution

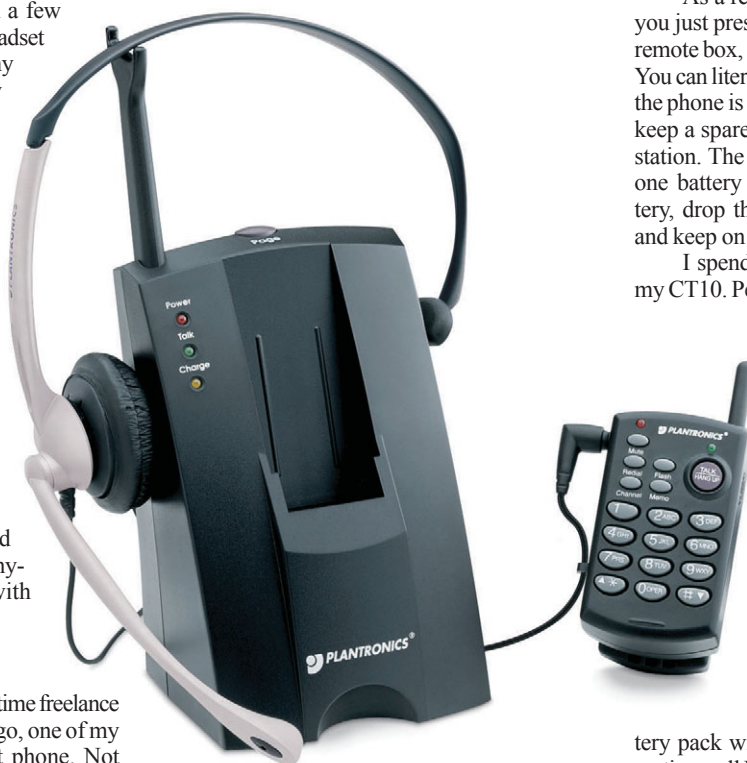
About a year ago, I discovered the Plantronics CT10 cordless headset phone. It has a ton of goodies for a cordless headset phone freak like me: 900MHz cordless technology, 40-channel auto scan, an ultra compact remote unit (just 1.75" x 1.75" x 3.75", including belt/clothing clip), 150-foot range, 6 hours of continuous talk time, 80 hours of standby time, variable volume control, 10 number speed dial, page/find capability, mute, noise canceling headset, out-of-range warning, low battery warning, built-in headset stand, and talk, charge, and power indicator lights.

What really sets the CT10 apart are two things. First, the headset itself can be unplugged and swapped with any of Plantronics cordless and mobile headsets. So, if the wire or the headset goes bad, no problem: just plug in a new one. Second is the REALLY cool part: the other part of the clothing/belt clip is the battery.

As a result, if you need to change batteries, you just press down on the clip, pop it free of the remote box, and slide in another clip/battery pack. You can literally do "flying battery changes" while the phone is on in 5 seconds! Even better, you can keep a spare battery trickle charging on the base station. The upshot of all that is that you can run one battery to exhaustion, pop on another battery, drop the depleted battery into the charger, and keep on talking.

I spend at least a couple of hours a day on my CT10. People have complimented me on how great it sounds, and it has become an absolutely essential part of my work as a writer. If you need to cure a pain in the neck caused by holding a conventional phone to your ear with your shoulder or if you would like to experience the freedom of a hands-free, cordless headset phone, I can give the Plantronics CT10 my highest recommendation as a great product, superbly executed.

The suggested retail of the CT10 is \$129.95 (and it's worth every penny), although discounters may have them for less. A spare battery pack will cost around \$25. For more information, call Plantronics at 1-800-544-4660 or visit <http://www.plantronics.com>.



The Plantronics CT10 is the best of the best in cordless headset phones.

What's NEW

Tell them you saw it in *Monitoring Times*

Esthetic Hands-free Operation

Hands-free headsets are becoming the only legal way to make cellular calls while driving, but they're also great with any two-way radio. Jabra Corporation has comfortable, creative hands-free headsets for nearly every purpose, including FRS and GMRS radios as well as cordless and cellular phones. One line of headsets is designed to work specifically with the entire family of Nextel Communications phones. They require no adapter and have an in-line, push-to-talk button for the Nextel Direct Connect two-way radio feature.



*The Bluetooth
FreeSpeak headset*



The *EarBoom* combines Jabra's custom-fit EarGels with a short, flexible microphone boom. The *EarWrap* features a noise-canceling microphone that eliminates ambient sounds and flex-forming ear wraps that conform to a person's

ear. The suggested retail price for the *EarBoom* is \$34.99, while the *EarWrap* is \$39.99.

However, these solutions still require a wire connection to the radio or phone, which is probably worn on the belt. Jabra's new BT100 *FreeSpeak* headset (around \$100) provides wireless connection to Bluetooth-enabled mobile phones up to 30 feet away. Bluetooth devices are still primarily available in Europe. But for an additional \$80, Jabra now sells an adapter which will enable Bluetooth reception by any phone with a 2.5mm jack.

Check Jabra's website at <http://www.jabra.com> for compatibility of the various earphone models with your specific radio or phone. You can order online, check the website for the nearest dealer, or call them at (800) 327-2230 (Pacific Time).

You CAN take it with you!

Cutting Edge Enterprises announces a compact solution for travelers carrying a handheld radio and accessories: the *RadioWallet*.™ When you leave home, you might have your handheld on your belt, but the charger, extra antennas, frequency lists, and extra battery are probably scattered throughout the car or the luggage. The *RadioWallet* is well constructed of padded, heavy-duty nylon with all of the edges fully finished for strength and durability. Inside, you'll see a padded divider pocket that separates the two halves of the case, giving you a way to protect all of your equipment. Put your radio on one side, the battery and



charger on the other, and your important notes, along with an antenna and a pen, in the divider pocket in between.

The *RadioWallet* comes in two sizes to accommodate a wide variety of radios. The case fits well in the hand, has a belt clip on the smaller sized case, and a hand strap. The small case measures 7"x4"x2" at a price of \$29.95; the larger case is 10"x4-1/2"x2-1/2" at \$34.95 from Cutting Edge Enterprises, 130 Anacapa Circle, San Obispo 93405; 800-206-0115 or from the web at <http://www.powerportstore.com>

Enhanced GPS Antennas

If you live in an area where service providers have added GPS positioning to existing cellular services, you might be interested in a new line of antennas from Antenna Specialists. The company's TeleLocator™ line of dual-system cellular/GPS antennas now include new roof top and trunk lid mounting options. These dual-system antennas combine active GPS location identification with broadband cellular for complete frequency coverage without tuning.

A single cellular/GPS antenna is a cost-effective solution for transit, construction, police and emergency vehicles; applications range from enhanced E9-1-1 cellular solutions to tracking/communications programs for fleet equipment.

Both antennas cover the 824-894 MHz cellular and the 1575.42 MHz GPS frequency range. The antennas ship with two 15 ft lengths of cable with appropriate connectors for cellular and GPS connections. Look for them at your nearest Antenna Specialists dealer.



Power Supply with Display

Edmund Scientifics announces a new power supply with digital



display. Features include a choice of three outputs: adjustable 0-30V, 0-3A; fixed 5V and 12V; or independent 5V and 12V outputs, providing power for TTL and CMOS projects. Easy snap terminals are provided for 5V and 12V, and binding posts for variable supply. Using the power supply gives overload and short circuit protection as well as constant voltage or current for your construction or repair project. Other specifications: current limiting front panel LED indicator; 110/220VAC, 50/60 Hz; 8" x 4.75" x 9". 10.5 lbs. The power supply is \$199.55 from Scientifics, Dept A021-C999, 60 Pearce Avenue, Tonawanda, NY 14150-6711; 800-728-6999 or order online from <http://www.scientificsonline.com>

Local TV Reception Made Easy

Although satellite TV providers are now permitted to include local networks as part of their lineup in order to compete with cable companies, truly local reception aren't available in many areas. Even if it is, it isn't free. TERK Tech-



What's NEW

Tell them you saw it in Monitoring Times

nologies has an easy answer to that: the outdoor antenna that simply clips on to your satellite dish. The TV42 attaches to 18-inch satellite dishes, and the new TV44 will fit the new 18-inch by 20-24-inch multi-satellite dishes.

The antenna clips to the rear side of the dish for low visibility. A built-in amplifier ensures against signal loss even with long runs, and a built-in diplexer combines the local antenna and satellite signals, so there's no need for extra wiring. Suggested retail prices are \$59.95 for TV42 and \$79.95 for TV44. Visit <http://www.terk.com> to find a dealer near you or call 631-543-1900.

New ARRL Handbook

When we think about traditions in the world of amateur radio, several things come to mind. Things such as the art of QSLing, which dates back to the very early days of the service, contesting, DXing, public service, building your own equipment, and many other facets of the hobby have stood the test of time. And so has a publication that discusses all those items and more. In fact, it is almost as famous as the amateur hobby and its publisher – *The Annual ARRL Handbook*.

The new 80th edition (first published in 1926) has just been released and it continues the long tradition of providing a valuable reference for not only hams, but engineers and researchers. The 2003 handbook is a massive 1216 pages and inside this comprehensive RF engineering reference you'll find chapters on an In-

troduction to Amateur Radio, Fundamental Theory, Practical Design and Projects, Construction Techniques, Operating Practices, Wireless Technology (pagers, cell phones...) and more.

New in the 2003 edition:

- An updated and comprehensive chapter on modulation sources including digital voice.
- A revised and comprehensive chapter on Digital Signal Processing (DSP) technology.
- A new high-power, automatic EZ-Tuner project by W8ZR.
- An "Ugly Transformer" project for high current, 120-VAC stations.
- A revised chapter on safety practices.
- A completely updated handbook address list in the references chapter.

In my early days of ham radio as a teenager, the *ARRL Handbook* was a yearly Christmas present that helped spark my long career in the world of electronics and communications. It is a reference like no other and deserves to be on the bookshelf of anyone involved in the world of electronics and communications.

The softcover eightieth edition (ISBN: 0-87259-192-1), © 2002, The American Radio Relay League, Inc. can be ordered from the ARRL website (<http://www.arrl.org>), on their toll-free telephone line 1-888-277-5289 (Outside US +1-860-594-0355), or via snail mail at ARRL Publication Sales Department, 225 Main Street, Newington, CT 06111-1494 USA. Order catalog #1921 - \$34.95 plus \$7.00 shipping.

— Reviewed by Larry Van Horn

Newnes Dictionary of Electronics

by SW Amos and RS Amos

(ISBN: 0-7506-5642-5)

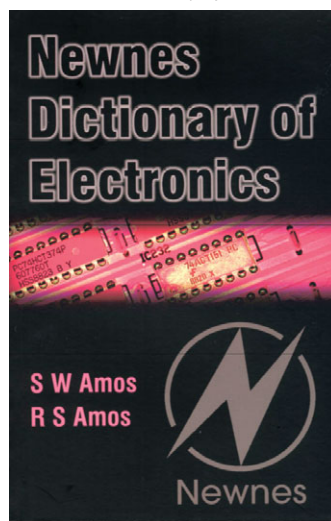
Sometimes there is no good substitute for a good old-fashioned dictionary, even when it comes to new-fangled terminology. Newnes has recently come out with a handy 5-1/2 x 8-1/2-inch paper-back version of the *Dictionary of Electronics*

by SW and RS Amos, the 4th edition, first published in hardback in 1999. Strong points to recommend this book to *MT* readers are the concise and understandable definitions, and the numerous diagrams and formulas which illustrate many circuits and concepts. There is also an appendix of electronic abbreviations and acronyms for quick look-up.

There are only a couple of drawbacks: the book is originally a British publication, so one must get accustomed to British spellings such as "stabilisation" or "fibre optics," although the authors made a concerted effort to include North American terminology and organizations. Secondly, although it contains a great deal of radio-related terminology, it is not specifically a dictionary of radio electronics. Though I didn't find LC circuit in the alphabetic listing, it was referred to under an illustration of parallel resonance.

On the other hand, the dictionary will be of great help as a general technical reference; much new material concerns data- and computer-processing. As a sample of the interesting mix, here are the entries on three pages from the "L" section (which also included four illustrations): liquid crystal display (LCD), Lissajous figures, Litz wire, L-network, load, load line, Local Area Network (LAN), local oscillator, locking, lock out, logarithmic decrement, logic, logical, logic element, logic gate, logic level, log in or log on, log off or log out, long-persistence tube ... etc!

The Dictionary of Electronics



is \$24.99 from the publisher at <http://www.newnespress.com> or call 800-545-2522 to order. Be sure to specify the ISBN and paperback version, because the hard copy is \$44.95!

— Reviewed by Rachel Baughn

Digital Scanner News

Delivery on the digital-capable Uniden scanners has been pushed back to late January, and guess what? The FCC assigned an ID number to the handheld BC250D separate from the BC785D after all! (See November *What's New*.) We suspect these two pieces of information are connected, but no one's telling.

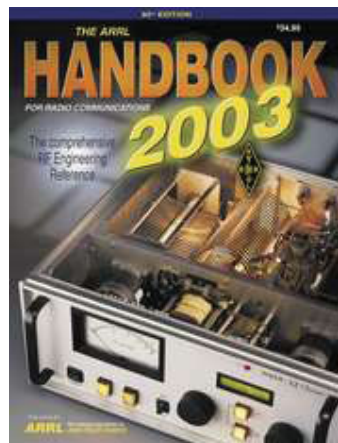
Availability of the digital-enabled Uniden models in Canada is also in question. In an email response circulated on the internet, Michael Tremblay of the engineering branch of Industry Canada (Canada's equivalent of the FCC), said that the analog version of the scanner did not require certification by Industry Canada. He said the digital card could not be sold separately but must be sold as part of the scanner, and once the card is installed, the scanner becomes analog/digital capable and therefore requires a separate certification number before it can be legally sold.

Uniden has both the 250D and 785D manuals on their site for download. The BCi25D has no manual posted.

<http://www.uniden.com/productsupport.cfm?product=BC785D>

<http://www.uniden.com/productsupport.cfm?product=BC250D>

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Powell Proposes Radical Shift for FCC

By Fred Maia, W5YI

"The government has an almost impossible task trying to keep pace with the ever increasing demand for spectrum and continuing advances in wireless technology and applications. ... We must establish new ways to support innovation and the efficient, flexible use of spectrum."

- FCC Chairman Michael Powell

The United States lags behind other developed nations in getting new generation wireless services in place. The trouble is there are few unallocated frequencies on which to operate. To remedy that problem, the FCC is looking for innovative ways to enable more efficient use of the radio spectrum. Speaking at the University of Colorado in Boulder in late October, FCC Chairman Mike Powell said finding more spectrum could lie in taking advantage of new technology.

Powell wants an end to the century-old system of government-decreed spectrum allocation. A better system might be for computer software and hardware to find vacant operating space. "While spectrum scarcity is a problem in some bands some of the time, the larger problem is spectrum access – how to get to and use those many areas of the spectrum that are either underutilized or not used at all," Powell said.

♦ New attitudes toward interference

The current system is to establish regulations to eliminate interference, "...but maybe that fear is no longer justified," Powell said. "Interference is often more a product of receivers. That is, receivers are too dumb or too sensitive or too cheap to filter out unwanted signals. Yet our decades-old rules have generally ignored receivers." Powell said he favors relaxing rules intended to prevent signal interference altogether, and supports new policies ensuring that interference stays within acceptable levels. "Transmitters could be required to ensure that the interference level – or 'interference temperature' – is not exceeded. Receivers could be required to tolerate an interference level."

Powell said the FCC "...should continuously examine whether there are market or technological solutions that can – in the long run – replace or supplement pure regulatory solutions to interference."

"Ultra-wideband" technology – an "underlay" approach that uses low power signals sent over a wide swath of already occupied frequen-

cies – can also free up spectrum and defeat interference. "...[I]f used right, spectrum is essentially limitless – that is, with modern receivers and transmitting devices that make yesterday's interference problems go away."

♦ Current spectrum policy

Since the 1930s, the U.S. Government has allocated specific parts of the airwaves to various government agencies and private companies, based on the principle that spectrum was a scarce and dwindling resource which had to be divided up fairly.

Powell's view is that even though fully licensed "...most spectrum is not in use most of the time." He said a spectrum survey conducted in five major cities showed that "...while some bands were heavily used, others either were not used or were used only part of the time." Powell believes these "holes" in bandwidth or time could be used to provide significant increases in communication capacity, without impacting current users, through the use of new technologies.

♦ What might be done

Last summer, Powell launched a task force to study spectrum policies and make recommendations. The goal of the Spectrum Policy Task Force (<http://www.fcc.gov/sptf>) is to assist the Commission in identifying and evaluating changes and improvements in spectrum policy.

Powell does not suggest an end to licensing. Instead he wants a thorough study of spectrum policy and possible "multiple approaches to more efficient spectrum use" ...a move away from hard line regulation toward more flexibility. He wants to give companies greater leeway in determining how their airwaves are used, and to reduce government's role.

The end result might be that commercial users of the spectrum could use their frequencies for additional telephone, Internet, television and other services. Companies also could be given the right to rent spectrum to others at times when it's not in use. He also suggested that devices may be able to "find" spectrum open space and use it until the licensee needs those rights for their own use.

♦ FCC considering "open spectrum"

The commission also plans to free up more parts of the spectrum for people and companies to use without a license, for local wireless networks or other purposes. It would be sort

of like the nation's highway system that anyone can use but no one owns.

The core of this concept is that software, new modulation schemes (such as ultra-wideband) and intelligent equipment (like software-defined radios) will be able to successfully navigate through congested public airwaves. It will be up to chip-makers, software writers and equipment manufacturers to create devices using common protocols that avoid or co-exist with virtual traffic jams.

Everyone, from ham operators to broadcasters, would travel on the same highway, limited only by the smart equipment they operate. Consumers and tinkerers would be able to come up with their own devices and applications just like they have on the Internet. In turn, the growing number of applications would create equipment and software demand.

A goal would be to limit exclusive frequency allocations and spectrum auctions ...instead encouraging spectrum users to share the same highway. Instead of regulating the spectrum, the FCC would enforce rules governing how people "travel" on the spectrum highway – much like how public authorities oversee use of our thoroughfares.

To make all of this become a reality, additional common spectrum would have to be made available to provide mutual airwaves that form a public airwave transportation system where equipment makers, inventors and entrepreneurs could experiment.

Some open spectrum advocates want the FCC to hold a single large auction for all available spectrum, then allow secondary trading of those rights ...sort of like permitting toll booths on the information highway.

♦ Notice of Inquiry coming

The FCC plans to update its rules in 2003 to allow commercial wireless companies to use new innovative technology to provide new telecommunications services without disrupting each other's signals. Such technology might also allow smaller companies to offer competing services without having to pay prohibitively huge amounts for frequencies.

On November 7th, the FCC's Spectrum Policy Task Force reported on its findings and made recommendations relating to the Commission's spectrum policy. As a result, the FCC plans to immediately begin a rule-making process seeking public input on how best to remodel the spectrum management process.

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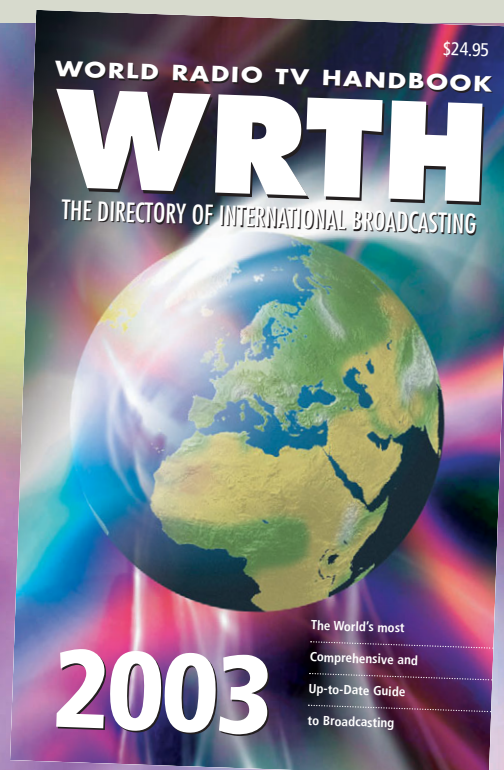
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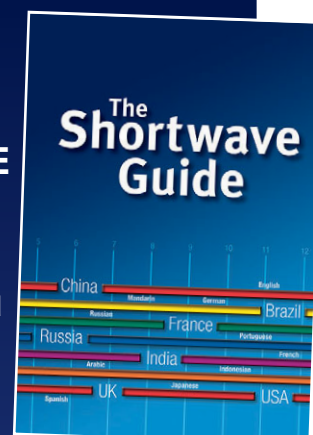
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